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HOME CANNING FRUITS AND VEGETABLES

AGRICULTURAL EQUIPMENT FOR SCHOOLS

NURSERY STOCK FOR SCHOOL PLANTING

THE WORLD'S WHEAT PROSPECTS FOR THE GRAIN YEAR, 1917-18

DEPARTMENT OF AGRICULTURE
OTTAWA, CANADA.

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DEPARTMENT OF AGRICULTURE

The Agricultural Gazette
of Canada

EDITOR: J B. SPENCER, B.S.A.

Issued by direction of
THE HONOURABLE MARTIN BURRELL
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The Agricultural Gazette
OF CANADA

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THE AGRICULTURAL GAZETTE of Canada is published monthly, in English and in French, by the Dominion Department of Agriculture. It is not intended for general circulation. A limited number of copies, however, are available to subscribers at $1.00 per annum, or 10 cents per copy.

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THE PRESERVATION OF FOOD

THE country has risen splendidly to the call for production. The duty now devolves upon all the people to make a wise use of the results. Waste in any detail at such a time is little short of a crime. It is an act of treason alike to the country and to all those who, individually and collectively, have responded to the demands that were made of them. This being admitted, it becomes a question how best the many diverse articles of food can be preserved for future use. The solution of that problem involves in certain measure a solution to the even more puzzling problem of the high cost of living. It goes further and means the release of a greater amount of food for the use of our armies in the field.

Cold storage affords one important means to the end in view, but there are other and more intimate ways that appeal to the dwellers alike in city and country. These consist principally of drying, canning, curing and preserving, four methods that can be carried on with almost equal facility, if not on the same scale, in the home as in the factory.

A dominion-wide educational campaign has been carried on in this connection, by the Federal Government through the Food Controller and the Experimental Farm system with the aid of experts, who have been engaged to give demonstrations, and by the provinces through short courses, largely made possible by grants under THE AGRICULTURAL INSTRUCTION ACT, by the circulation of bulletins, pamphlets and circulars, giving advice and instruction as to the best methods to adopt, the utensils required and so on, and with the assistance of municipal councils, boards of trade, horticultural societies, women's institutes and homemakers' clubs. Public meetings have been held, competitions arranged, lectures given and every method of practical teaching employed, all with a common object in view, in the first place to encourage production, in the next conservation, and, finally, the avoidance of waste.

The steps that the provinces have individually taken are set forth in a series of articles in this number of THE AGRICULTURAL GAZETTE by which it will be seen that operations have been conducted on a generous and comprehensive scale and with a degree of earnestness that denotes permanency in beneficial results.

PART I

Dominion Department of Agriculture

INFORMATION SUPPLIED BY OFFICIALS OF THE VARIOUS BRANCHES REPRESENTED

THE DOMINION EXPERIMENTAL FARMS

THE POULTRY DIVISION

ECONOMY OF THE PULLET

FOR a number of years records have been kept at several poultry plants of the Dominion Experimental Farms System of the egg production of early pullets, late pullets, yearling hens, two-year-old hens and older. These records were kept with the view of arriving at a definite conclusion relative to the influence of age upon the cost of egg production.

Many factors influence the records of the individual pen, climatic conditions being one of the chief. Late pullets and hens show to better advantage in the milder localities, a fact that can be attributed to the short winter season; but the early hatched pullet has proven to be the most profitable, heaviest, and most economical producer when a general average is taken of all the records.

The following table gives a summary of average results for the past three winters from records of many pens of pullets, yearling hens, two-year-old hens and older:--

AGE	Number of Birds	Average Weight of eggs per Dozen	Average Price per Dozen	Total Value of Eggs	Cost of One Dozen
Early pullets	292	23.2	43.2	$451.73	18.3c.
Late pullets	152	22.7	43.1	221.88	56 "
Yearling hens	161	24.7	47	176.48	78.2 "
Two years old and over	79	24.2	44	13.94	$5.73

It would appear from the foregoing that there is considerable loss from late pullets the first winter, and from hens during their second winter laying, though these prove profitable sometimes. It may be well to point out that some of the records were obtained during December, January and February only, a season of low production for hens, and that a number of hens on the Farms system are kept over their profitable period for special breeding purposes, and the egg yield from these would enter into, and adversely influence, their average.

In considering the average weight per dozen as shown in the foregoing table, it may be pointed out that although the pullet average is below that of the yearling hen and two-year-old, this is primarily caused by the few exceptionally small eggs that the pullet produces at first, which are sufficient to reduce the general average. In utility breeds, however, pullet eggs soon attain a fair marketable size, so that this slight difference in the weight per dozen eggs cannot offset her claim to the distinction of being the most profitable bird to keep. The conclusion drawn from the records, and as shown in the table, indicates that for winter egg production the early-hatched pullet is the most profitable, the yearling seldom as profitable, and the late pullet and two-year-old hens and older, with but few exceptions, not at all so.

THE HORTICULTURAL DIVISION

CANNING FRUITS AND VEGETABLES

IN view of the campaign conducted to encourage greater production of food products, especially fruits and vegetables, in the cities and in the vicinity of cities, the Central Experimental Farm is conducting a number of experiments for the purpose of securing data relative to practical home canning and food preservation.

To conduct the practical work, the services of Miss Laura Kirby, a graduate in Domestic Science from Macdonald College, have been obtained. Miss Kirby, in addition to carrying on the experimental work, will give demonstrations in home-canning methods. For this purpose a room in the horticultural building, Central Experimental Farm, has been fitted up, which is open to the public on certain days of each week. The Horticultural Society and the Women's Canadian Club of Ottawa are also jointly arranging for canning demonstrations, at each of which Miss Kirby will be the demonstrator in charge.

The experiments now under way will include the test of seven different canning outfits. In addition to the experimental work with these outfits, it is proposed to try the canning of fruits and vegetables in water only, without the addition of any preservatives.

Two circulars entitled "Notes on the Drying of Fruits and Vegetables" and "Notes on the Home Canning of Fruits and Vegetables," respectively, have been prepared, and are distributed gratis to people visiting the home-canning room and demonstrations at the Central Experimental Farm.

APPOINTMENTS

MR. C. B. Gooderham, B.S.A., formerly assistant Entomologist, Department of Agriculture, Truro, N.S., has been appointed Assistant Apiarist at the Central Experimental Farm. Mr. Gooderham graduated from the Nova Scotia College of Agriculture in 1915, spent two years as laboratory assistant at Truro, N.S., and graduated from Macdonald College in 1916, specializing in entomology. Since graduation, in addition to his duties as Assistant Entomologist, he has had charge of the administration of the Foul Brood Act in Nova Scotia and of the College apiary.

Major N. D. MacKenzie has been appointed Assistant to the Superintendent of the Experimental Farm at Brandon, Manitoba.

Major C. B. Nourse has been appointed Assistant to the Superintendent of the Experimental Farm at Indian Head, Saskatchewan.

THE DAIRY AND COLD STORAGE BRANCH

THE CHEESE COMMISSION

IN March last the Imperial Board of Trade intimated a desire to purchase the entire exportable surplus of Canadian cheese for the season of 1917. With that end in view a representative of the Board, in the person of Mr. James McGowan, was sent to Canada, and the Canadian Government was requested to nominate two commissioners to act with Mr. McGowan for the purpose of dealing with the whole question. The Minister of Agriculture nominated Mr. Jas. Alexander, cheese exporter of Montreal, and Mr. J. A. Ruddick, Canadian Dairy and Cold Storage Commissioner, as the Canadian members of the Commission.

The Board of Trade purchased the entire output of New Zealand cheese for the season of 1916-17 at 19c f.o.b. steamer in January last, and was desirous of securing the Canadian output at the same figure. In view of the difference in the market value of Canadian and New Zealand cheese, and the further fact that values in all food products had risen during the interval, it did not seem reasonable that Canadian cheese should be sold at the same price as that paid for New Zealand cheese some months previously.

After negotiation the Board of Trade finally authorized the Commission to offer 21¾c f.o.b. steamer Montreal for the exportable surplus of Canadian cheese for the season of 1917. The Commission, having formulated rules to govern the acceptance of cheese on these terms, laid the whole plan before the cheese trade on June 5th, and all regular dealers were invited to offer cheese in lots of 500 each of a single grade and colour.

The Commission recognizes three grades of cheese, thus conforming with the regular commercial practice. The dealers are required to purchase the cheese at the country boards, or otherwise, in the same manner as heretofore. The dealer determines the grade of individual shipments from each factory, and supplies the Commission with a list of cheese which he has to offer, stating the grade and quantity. When the cheese are definitely shipped for overseas shipment the inspectors employed by the Commission examine the offerings to see that the quality and quantity agree with the invoices and specifications submitted by the dealer. On delivery to the ship, and presentation of Bills of Lading and other documents, the Commission issues a cheque to the dealer in settlement.

Under this plan the existing organization and facilities for handling the cheese business have been utilized to the full extent. The cheese come to Montreal through the usual channels, the only difference being that the buyers know exactly what they will receive for their weekly receipts and speculation is thus eliminated.

Owing to the exigencies of the shipping situation "through" shipments of cheese from Western Ontario and direct shipments from Prince Edward Island are quite out of the question, and this condition, rather than the rules of the Commission, have made it necessary to have all cheese warehoused in Montreal. That is the only departure from the usual routine of the trade under the purchase of cheese by the Commission. The Commission does not grade the cheese. That responsibility lies with the dealer, who must settle with the factories as he has done in the past.

It was feared by some, when the plan was first proposed, that the cheese dealers would combine and not pay full value to the factories; but the Commission, knowing the cheese trade, relied upon the competition between the buyers to ensure full value being paid in the country. The results have amply justified this view. As a matter of fact, the prices paid in the country have, in many instances, been too high to permit of any profit after paying inland freight, cartage, warehousing, cooperage, etc.

In view of the difficulties of the shipping situation the arrangement for taking delivery of the cheese at Montreal is a very fortunate one for the cheese producers of Canada. If the regular exporters, under the existing conditions, had to take chances on finding sufficient ocean space, the risk involved would be so great as to necessitate a much wider margin than usual between the prices paid in the country and the prices received on delivery in the United Kingdom.

THE ENTOMOLOGICAL BRANCH

SHADE TREE AND FOREST INSECTS IN MANITOBA

BY J. M. SWAINE, ASSISTANT ENTOMOLOGIST FOR FOREST INSECTS

INSECT injuries to our shade and forest trees are so extensive and so serious that the control of injurious insects affecting trees becomes a very important factor in the conservation of these resources. The annual loss in Canada from the ravages of forest and shade tree insects amounts to many millions of dollars. Part of this great loss is beyond any human means of prevention thus far devised; but it is true that many of our most destructive forest insects and practically all of our shade tree insects can be effectively controlled by feasible methods.

We have selected for this discussion only the species that have been most injurious in Manitoba during the last few seasons.

SHADE TREE INSECTS

An examination of our shade trees in any section of the country reveals many serious insect injuries. Boring insects in the bark and wood of the trunk and branches, defoliating insects of many kinds, and sucking insects on the leaves and tender bark combine to check the growth, mar the beauty and very frequently to kill our finest trees.

Nearly all these insect species are native to this country, and are more or less injurious in the forest. Many of them are seldom found causing any important injury under natural forest conditions, although they are well known and dreaded enemies of shade trees. As a rule each of these insect species feeds upon only a few kinds of trees, and since the number of shade trees available for them in any locality is limited, they concentrate their attack upon a few trees and injure them very seriously. On the other hand, it is more often feasible to control or prevent injuries by insects on shade trees, since the greater value of the individual trees enables us to employ methods of control that could never be used at all under forest conditions

It seems to be particularly unfortunate that the shade trees of the Prairie Provinces should be so seriously affected by injurious insects. The poplars, willows and Manitoba maples, utilized so widely for shade trees and shelter belts, are particularly subject to attack by insects, and have been affected with exceptional severity during the last two summers. That they will be troublesome again in 1918 is more than probable, and, even at the risk of a tiresome repetition, it seems desirable to discuss briefly the most serious of these injuries and the most practical means of control.

THE WESTERN WILLOW LEAF-BEETLE, *Galerucella Decora* SAY

This injurious species is a small, dark-yellow or brownish beetle, rather flat and about three-sixteenths of an inch in length. Both adults and larvae feed upon the leaves of willows and poplars, stripping off the green surface, more or less completely destroying the foliage, and leaving the trees scorched and brown. Many trees were killed last summer and the summer before in badly-infested districts in the Prairie Provinces, more particularly in Alberta and Saskatchewan, but also in western and southern Manitoba.

The adult beetles appear in the early summer from their hibernating places under the litter beneath the trees upon which they have bred, and feed upon the young willow or poplar foliage.

The dark-coloured eggs are laid in clusters of three to five on foliage of willows or less commonly of poplars. The willow is apparently the favorite food plant of the larvae, although they feed readily upon all poplars except the aspen, upon which they are less commonly found. The larvae are light yellow with a wide dark stripe along the back, a dotted line along the sides, and the head black. The eggs are laid on the leaves and the larvae are present throughout the summer, maturing during the latter part. The young adult beetles feed for some time upon the foliage and go into hibernation beneath the leaves upon the ground. When they occur in enormous numbers, the food supply is soon exhausted and the beetles fly away in an immense swarm in search of further feeding grounds and breeding places. These swarms of beetles will light upon poplars and willows over which they pass and defoliate the trees in an exceedingly short time. Within a few hours the beetles may pass on to continue their injurious work elsewhere. Eventually the swarms disintegrate, and the beetles spread over the available foliage to lay their eggs for the next brood. It appears certain that these immense swarms originate in extensive areas of willow and poplar scrub, hibernate on the ground beneath the fallen leaves, and, after stripping off the foliage at hand early in the following summer, leave on their destructive "flight."

Control Measures.—The young or grubs and also the adult beetles when they are present in moderate numbers can be effectively controlled by spraying the infested foliage with lead arsenate or with Paris green. When the beetles appear suddenly in very great numbers, these poisons are not always efficient, since the foliage is often destroyed before the poison can be applied and become effective. Some other means must therefore be employed to cause the beetles to cease feeding immediately. This can be done with considerable success by spraying the beetles on the foliage with kerosene emulsion in as strong a mixture as the trees will bear, at the rate of one part of the stock solution to six parts of water. If the trees are jarred or shaken, many beetles will drop to the ground and may be sprayed then with the kerosene emulsion. This will, of course, only affect the insects then upon the trees and those actually wet by the spray. Strong smudges of damp hay and manure, giving off volumes of smoke beneath the trees, have been successful in driving away the swarms, and can be used with advantage in an emergency instead of the kerosene emulsion, until the lead arsenate or Paris green can be applied.

After the main flight of the beetles is over many beetles and frequently the young may be found feeding upon the foliage. Whenever this occurs, or other leaf-feeders, such as the Yellow-spotted Willow Slug, become abundant, lead arsenate or Paris green will hold them in check.

CANKERWORMS

The Fall Cankerworm, *Alsophila pometaria* Harris, has been particularly injurious to Manitoba maples in the provinces of Manitoba and Saskatchewan during recent years. The adults of these small caterpillars are brownish-gray moths about one-half an inch long. The males have thin delicate wings, but the females are wingless and must crawl up the tree trunks to deposit their eggs. When the caterpillars have become full grown they descend to the ground on a thread of silk and bury themselves below the surface. There they change first to the pupa, or resting stage, and later to the adult, or moth. The latter usually appears in the fall, and the wingless females ascend the trunks to deposit their eggs upon the bark of the branches and twigs. The eggs hatch late in April, or in May, and the caterpillars feed upon the foliage for about a month, becoming about an inch in length when full grown. When the caterpillars are very numerous they are able to defoliate the trees entirely and to cause serious injury.

The moth of the Spring Cankerworm, *Paleacrita vernata* Pack., emerges from the ground and deposits its eggs upon the bark in small clusters during the first warm days of early spring. That of the Fall Cankerworm, which is the more abundant and injurious species in Manitoba, emerges from the ground in large numbers during the latter half of October and deposits its eggs upon the bark of branches and twigs in clusters of from 100 to 400. The eggs remain upon the trees during the winter and hatch in the spring. The cankerworms are slender, greenish, yellowish or blackish caterpillars, about one inch long when full grown, light green below and with one yellow and three narrow white stripes along the sides.

Remedial Measures.—Cankerworms may be controlled either by banding the trees with a sticky substance to prevent the wingless females crawling upon the trunks to deposit their eggs, or by spraying the infested foliage with poison while the caterpillars are small.

Spraying with Arsenates.—The infested trees should be sprayed with Paris green or with lead arsenate *as soon as the caterpillars appear* so as to poison the latter before they do much injury. After the cankerworms are half grown it is more difficult to kill them with poison.

Lead arsenate is the most satisfactory spray mixture for this purpose. It should be used at the rate of 6 to 10 pounds of the paste in 100 gallons of water; the stronger mixture is used when the caterpillars are more than one-half an inch long.

Paris green may be used instead of the lead arsenate at the rate of one pound mixed in 100 gallons of water. To avoid burning the foliage one pound of freshly slaked lime must be added to the mixture for each pound of Paris green used.

The first application should be made as soon as the caterpillars appear on the leaves, probably early in May. A later spraying may be necessary, particularly if heavy rains follow the first application. Apple trees should be sprayed just before the blossom petals drop. The spray should be carefully applied and all the leaves thoroughly covered.

Banding.—When cankerworms have been abundant in a district and a recurrence of the injury is to be expected the following season, valuable trees may be protected from injury by applying a sticky band about the trunk to prevent the wingless females crawling up to deposit their eggs upon the branches.

A strip of thick wrapping paper is tied about the trunk with two strings five or six feet from the ground, and to this the sticky substance is applied in a complete ring about five inches wide. An excellent sticky mixture is made by boiling together equal parts of resin and castor oil. Even the common sticky fly papers may be used effectively. To be effective the sticky bands must be applied during the second week in October, before the females begin ovipositing, and must be kept fresh until the ground is frozen.

PLANT LICE ON THE MANITOBA MAPLE

The Negundo Plant Louse, *Chaitophorus negundinus* Thos. This small green plant louse is the most persistent and serious enemy of the Manitoba maple in the Prairie Provinces. The insect appears in enormous numbers early in the season and sucks the juice from the foliage, killing many of the younger leaves, deforming many others, and through a copious exudation of a fluid known as honey dew inducing the rapid development of a black sooty fungus, which covers and seriously disfigures the foliage. In bad infestations there is considerable defoliation, especially of the partly developed leaves. Usually the many insect enemies of the pest so reduce its numbers that the trees may develop normally through the latter half of the season.

Control Measures—Plant lice obtain their food by sucking the plant juices through their slender beaks with which they pierce the tissue. Poison sprays, therefore, are ineffective, and control is obtained by spraying with an insecticide which kills by contact. Such contact insecticides are: kerosene emulsion, fish oil or whale oil soap, and the nicotine extracts. Kerosene emulsion, diluted one to nine, is often most readily obtained, and is entirely effective if thoroughly applied as soon as the insects become numerous. In some seasons, later sprayings are necessary.

A TWIG-BORER OF THE MANITOBA MAPLE

The Negundo Twig-borer, *Proteopteryx willingana* Kearf., is more or less injurious each season to twigs of the Manitoba maple. The injury is caused by the caterpillar of this small moth boring into the young twigs, causing them to develop into elongated hollow galls within which the caterpillar lives and feeds, extruding the excrement through a hole in the side. Many twigs and even small branches may be badly stunted or killed, and when the caterpillars are numerous, the injury, particularly to small trees, is often considerable. The caterpillars become full grown during June, and pupate either in the ground below the trees, or, infrequently, within the galled twigs. The adult moths emerge from the pupal cases during July. The young caterpillars are said to feed upon the leaves for a short time before entering the twigs.

Control Measures.—The only remedy that has been suggested is to collect and burn the infested twigs early in June to check the spread of the injury. This method obviously has a very limited application, but may be employed when the injured trees are small. It is possible that a spray of Paris green or lead arsenate applied about the end of June would destroy many of the young caterpillars.

THE SPRUCE SAWFLY, *Lophyrus abietis* Harr.

The caterpillar-like larva of this sawfly is not uncommon in Manitoba, feeding upon the needles of cultivated spruces. The trees are sometimes almost entirely defoliated by them. The larvae are readily killed by spraying the infested foliage with lead arsenate or Paris green.

SPRAYING SHADE TREES

For the application of sprays a spray pump of some sort is, of course, necessary. A power sprayer is needed to cover very high trees, but for most trees of the prairies a spray pump of almost any sort, fitted with proper hose and an extension nozzle will do very effective work. A barrel pump, or even the half barrel size, will spray small trees, and even the very cheap bucket-pumps and knap-sack sprayers may be used with astonishing effect. These spray pumps can be obtained through the local seedsmen or hardware merchants. Such a method of protection can, of course, be profitably applied only to ornamental and shade trees, and to wind breaks, valuable enough to warrant the expenditure of a few cents per tree.

Lead Arsenate.—Leaf-feeding insects of all kinds are usually best controlled by poison sprays. Lead arsenate is one of the best of these for use on shade trees; its initial cost is somewhat higher, but it adheres to the foliage longer, and does not often burn the leaves when used at the ordinary strength. It is usually sold in the form of a paste, and should be worked up in a small amount of water before being diluted. For general spraying against leaf-feeding insects, two pounds are mixed with 40 gallons of water; but for bad infestations of cankerworms, especially when the caterpillars are more than one-half grown, three to five pounds to the barrel of water should be employed.

Lead arsenate is also used in the form of a powder. One pound of the powder will do the work of about two pounds of the paste.

For use in small quantities:—

Lead arsenate, paste	1 tablespoonful
Water	1 gallon

Paris green is used at the rate of four ounces mixed in 40 gallons of water for general spraying against leaf-feeding insects. When a stronger mixture is required, the poison may be increased to five or six ounces in 40 gallons. There must be added at least as much freshly slacked lime as Paris green to prevent burning the foliage, and the spray mixture must be kept well stirred while spraying is in operation:

Paris green	4-6 ounces
Fresh lime	½-1 lb.
Water	40 gallons

For use in small quantities:—

Paris green	1 heaping teaspoonful
Mixed in water	3 gallons
Freshly slaked lime	3 ounces

Kerosene or Coal Oil Emulsion is a very effective spray mixture for the control of plant lice, and other *sucking* insects. It must wet the insects in order to affect them, therefore the application should be thorough.

One half pound of hard soap is shaved fine into one gallon of hot water and stirred until dissolved. Two gallons of kerosene (coal oil) are then added and the mixture immediately churned violently until a thick creamy emulsion is produced. This churning is best done with a bucket pump, putting the nozzle back into the bucket. The stock emulsion which is obtained when the mixture is properly made will keep for months if covered from the air. For use on plant foliage it must be diluted with water at the rate of one part of the stock solution, well mixed, usually in from 9 to 12 parts of soft water.

Stock Emulsion:

Laundry soap	½ pound
Soft water (hot)	1 gallon
Kerosene (coal oil)	2 gallons

Diluted Spray:

Stock solution	1 gallon
Water	9 to 12 gallons as required

Whale-oil or Fish-oil Soap is used for the same purpose as kerosene emulsion. It may be employed against plant lice at the rate of one pound dissolved in from four to six gallons of water. Its unpleasant odour makes this insecticide less desirable for use on shade trees.

Tobacco Extracts.—Several valuable preparations of nicotine may be obtained from dealers in insecticides. "Nikoteen" and "Black Leaf 40" are among the best of these, and are very effective in controlling plant lice. Soap should always be added to the diluted spray at the rate of about one pound to forty gallons.

TWO DESTRUCTIVE FOREST INSECTS

There are many injuries by destructive insects in the forested area of Manitoba, but only two of them are selected for this paper. The first, the Larch Sawfly, has spread into the province only recently from Ontario; but it has already killed a considerable amount of timber and the remaining larch is in danger of wholesale destruction. The second injury, by boring grubs in pine and spruce logs and fire-killed trees, ruins a large amount of timber each season, and constitutes one of our most important forest losses.

THE LARCH SAWFLY, *Nematus erichsonii* HARTIG

The larch or tamarack has been very largely killed off throughout many sections of the eastern provinces by this very destructive species, which is now firmly established in the larch areas of Manitoba, and has spread westward into northern Saskatchewan.

The injury is caused by the larvae, known as false caterpillars, feeding upon the larch foliage during the summer. The larvae are greenish in colour with black heads, and have the habit of coiling the body around the needles upon which they are feeding. When they are very numerous the trees are practically defoliated and serious injury results. Larches which have been stripped of their foliage for three years in succession usually succumb, either as a direct result of defoliation or to attack by the Eastern Larch Beetle.

The Larch Sawfly is preyed upon by several species of native parasites, but, unfortunately, they are seldom able to check its activity before the trees have been very seriously injured. The sawfly also occurs in England, but species of small parasitic flies, native to that country, are able to hold it fairly well in check. Several years ago the Dominion Entomologist, Dr. Hewitt, imported large quantities of cocoons infested with these valuable parasites from England, and they were distributed in sawfly-infested larch swamps in the Riding Mountain Reserve and in the Spruce Woods Reserve of Manitoba. Last summer it was determined that these beneficial parasites had become established in the Spruce Woods Reserve, and it is hoped that they will eventually become an important factor in controlling the Larch Sawfly in this country.

When this insect attacks cultivated larches it is readily controlled by spraying the foliage with either lead arsenate or Paris green.

BORING GRUBS IN LOGS AND FIRE-KILLED TIMBER

Pine and spruce logs and standing trees killed by fire or bark-beetles or any other cause, are usually very badly injured or ruined by the tunnels of large boring grubs if left unprotected in the woods for two seasons or even for one. The chief injury is caused by large, whitish, legless, boring grubs, the young of very large long-horned beetles, grayish or black in colour, and commonly known as Sawyers.

The beetles fly about in the sunshine and lay their eggs in the slits cut in the bark of dying trees and logs. The young grubs feed upon the inner bark and sapwood for several weeks and then excavate an oval tunnel nearly as large as one's little finger down deep into the wood. The tunnel usually passes across the fibers far in toward or quite to the heart and then out again to the surface. The grub spends two seasons in the wood and changes to the adult beetle, which cuts its way out through the bark about two years after the eggs were laid.

These beetles are very abundant in the forest areas of northern Manitoba and everywhere throughout our eastern coniferous forests.

THE INJURY TO FIRE-KILLED TIMBER

In timber injured or killed by ground fires in the early season, the destruction of the timber value by these boring grubs is usually complete before the second winter following the fire. If the fire occurs in July the adult beetles will be about the trees in thousands actually before the ground is entirely cooled; and in a very short time the piles of boring dust about the base of the trees, together with the saw-like sound of the thousands of pairs of jaws, betrays the presence of the grubs within the wood.

When the fire occurs late in the season, after the adult beetles have largely dispersed, few eggs can be laid in the dying trees that season, and by the following summer the bark has usually become too dry to attract the egg-laying females; so that timber in late season burns is rarely seriously injured. Also in the hotter parts of the fire, where the bark is badly charred or burned on most of the trunk, no eggs are laid, and consequently the timber is immune. Unfortunately, timber so badly charred very frequently cracks as a result of the rapid drying.

Grub-infested timber on a burn must be logged the first winter following the fire, or earlier, and should be placed in water as soon as possible. The loss caused by these grubs may be partly realized when it is considered that practically all the saw timber on an average burn would be sound and perfect for a generation if it were not for the boring grubs and parasitic wood destroying fungi. As I have said before, the control of ground fires is merely a highly effective method of preventing insect injuries.

Control Measures.—Efforts to prevent injury by these grubs will include: prevention of egg-laying, by densely shading or by watering the logs; destruction of the grubs already in the bark before the wood is injured, by barking the logs or watering them in the early season; and the reduction of the numbers of the beetles by systematic destruction of their breeding places—in other words, slash-burning.

Of several control methods, tested by us and by others at various times, these are outstanding as effective and feasible; watering the logs early in the the season, covering the log piles densely with brush, and barking the logs to be protected.

Floating the Logs.—Logs which must be left in the limits over a season should, if possible, be placed in the water as soon as the ice is gone. If the logs are placed in a loose boom so that there is considerable drift—and therefore the top side of the log is frequently wet—there is rarely any serious injury; but an additional safeguard is found in turning the logs about one month after they have been floated. I have not known logs handled in this way to be seriously injured by borers. If, as rarely occurs, the logs must be made into a close boom, so that there is little or no wave play over the top side of the logs and little rolling of the logs, the turning should not be omitted. Floating the logs is the cheapest and most satisfactory control method when good watering facilities are available.

Barking the Logs.—If the cut, or any part of it, must be left over summer in the woods, the logs can be completely protected by barking them before the middle or end of July. The beetles which appear later will not lay their eggs upon bare wood, and the young grubs from eggs already laid feed for nearly a month on the inner bark and sap wood before boring down below the wood surface, and would therefore be removed with the bark.

Covering Logs with Brush.—If barking the logs is considered too expensive or must be discarded for lack of labour, and water is not available, we believe that the logs can be quite as completely protected by covering them densely with brush before the men leave the woods, or at least before June 1. The logs should, of course, be piled on skidways, and should receive a very thick and complete covering of green spruce, pine or balsam boughs. The spruce brush makes the densest shade, and should therefore be used when it is easily available. The beetles love the sunlight, and will not enter the dense shade to deposit their eggs in the bark.

Other methods employed in our tests, and recommended by certain lumbermen, gave a varying amount of protection, but none of them for either cheapness of operation or effectiveness in protection could be compared with covering with brush. For instance, crib-piling the logs in the open does not, in our experience, protect effectively the under side of large pine logs, since the under side is only moderately shaded and not effectively dried; spruce logs are apparently fairly well protected by crib-piling, probably because the bark is thinner and drys more rapidly. Scoring along the top side of the log is only partially effective.

SLASH BURNING AS A METHOD OF CONTROL

The borers we have been discussing are always found in slashings, breeding in cull logs, tops and larger branches of the previous two winters' cut. They are apparently attracted long distances by the odour of the injured bark and wood, and it is evident both that the slash serves as a breeding reservoir and that it may be utilized as a trap for the destruction of the beetles. If the slash from extensive cutting is allowed to accumulate from year to year, the beetles will always be present in the limits in great numbers; whereas, if the slash is burned each season, the numbers of the beetles on the limit must be very greatly lessened at least. If the burning is done before the summer following the cut, the breeding-places are destroyed, but the insects themselves are not killed; while if the coarser slash is piled and left to be burned the following fall or winter, it will be filled with the grubs during the summer and the fire will destroy immense numbers of them. If the limit is isolated the insect control will of course be much more effective than if there are large bodies of neglected slash or recent burns nearby.

In addition to the larger wood borers which have been the subject of our discussion, the slash invariably serves as a breeding ground for countless myriads of other bark and wood boring beetles of many species; and some of these forms, when they become numerous enough, attack and kill green timber, particularly the unthrifty or overmature trees. Slash burning affects these many species as it does the destructive wood borers, and can be made to serve as a trap in the way already described. When we consider the matter solely from the standpoint of insect control, it is beyond all question that the practice is of great value; and I have stated elsewhere that, on a large and valuable limit, handled as a permanent enterprise for use of future generations as well as our own, the benefit derived from insect control will in the long run largely, if not entirely, repay the extra expense involved. That is an indefinite statement, because we have not yet the statistics to prove it, but when we add to the credit side the destruction of fungi and prevention of their development, the removal of the fire hazard and improvement of travel in the limits, the case for slash-burning becomes very strong.

BORERS IN CAMPS

Camps made of unbarked logs are frequently infested by wood-boring grubs. Barking the logs shortly before cutting, of course, prevents any such nuisance. If the logs are to be used in the unbarked condition for building purposes they should be cut in the fall, and piled loosely off the ground, so that the inner bark may become thoroughly dried before the following July

Building lumber, on which part of the sapwood and bark have been left, is sometimes found to be infested with boring grubs long after the building has been erected, and the lifetime of the grubs in such dry wood is often extended to an extraordinary degree. Green lumber bearing sapwood and bark should be avoided for building purposes.

THE FRUIT BRANCH

FRUIT DISTRIBUTION

BY F. H. GRINDLEY, B.S.A., ASSISTANT TO THE COMMISSIONER

AT this time of the year the problem confronting fruit growers, and giving them the most concern, is that of marketing. There is a certain quantity of fruit produced every year in Canada, and whether that fruit will be consumed depends upon (1) supply and demand, (2) extent and quality of the crop, (3) prices, and (4) distribution. This year conditions are such that the whole situation rests upon the question of distribution.

At the present time an embargo prevents the export of Canadian apples to Great Britain and Australia. Under normal conditions, and with an average apple crop, Nova Scotia would send 750,000 barrels of apples to Great Britain, Ontario would export one million barrels to the same market, and Australia would receive 70,000 boxes from British Columbia. Anything preventing the movement of fruit through those channels would seem, at first sight, to cause a very serious situation, and one which might well give Canadian fruit producers some concern. Fortunately, however, there is every reason to believe that no difficulty will be experienced in marketing the Canadian apple crop this year.

It so happens that the crop is extremely light in Ontario and Quebec, and, consequently, many large consuming markets which ordinarily look to these provinces for their supply, must seek elsewhere for it. British Columbia has a fairly good crop, though not as heavy as last year.

All eyes are on Nova Scotia. Early estimates placed the Annapolis Valley crop at one million barrels, and in spite of a very severe wind storm which swept through that section about August 10, there is still every reason to expect that the crop will about equal the reports made some weeks ago. Bearing that in mind, and remembering that the Ontario crop is only 30 per cent of normal, there is a big gap in consuming centres which must be filled by Nova Scotia and British Columbia.

British Columbia will not have enough apples to supply the Prairies, because usually it takes the combined crops of Western Ontario and British Columbia to feed those markets. Nova Scotian apples will, therefore, undoubtedly move west in large quantities.

Then there are the cities of Montreal, Toronto, Ottawa, as well as other cities and towns in Ontario and Quebec which will clamor for apples—ordinarily supplied by Ontario and Quebec. This clamoring must be quietened by Nova Scotia.

In other words, there can be no doubt that the consuming power in Canada is great enough to dispose of our entire available apple crop—if distribution is regular and thorough and systematically governed.

It is no easy matter to move three

thousand or more carloads of apples, and to arrange the distribution of such a large quantity of fruit so that no markets are over-supplied and that all markets receive about their usual quota. But proper organization can do it, and with fruit conditions in Canada as they are, there is no reason why the available supply of apples should not be distributed and consumed at home at reasonable prices to all concerned.

THE HEALTH OF ANIMALS BRANCH

HEMORRHAGIC SEPTICEMIA OF CATTLE

BY A. E. MOORE, CHIEF TRAVELLING INSPECTOR

HISTORY

HEMORRHAGIC Septicemia of cattle is a contagious disease, and is due to an oval-shaped micro-organism known as the Bacillus Bovi Septicus.

The disease was first pronounced in Germany in 1879, and is, therefore, comparatively speaking, quite new. It was first seen in America in the year 1898, when it made its appearance in Tennessee.

The first outbreak discovered in Canada was in 1902 at a place called Bury, near Sherbrooke, in the province of Quebec. In September, 1902, this Department requested me to investigate a disease in cattle at Bury that was thought to be anthrax. After a careful investigation I was satisfied that the disease was not anthrax. Instead, I found symptoms and post mortem lesions similar to those described in the text books as hemorrhagic septicemia. As the disease was then unknown in this country, I did not wish to pronounce positively without further investigation.

One year later, in September, 1903, I again visited the Sherbrooke district, and, in company with Dr. A. W. Tracy, the local veterinarian, visited an infected farm where we found some very typical cases and positive post mortem lesions. I then had no hesitation in pronouncing the disease hemorrhagic septicemia. From year to year since, this disease has been frequently seen in different parts of Quebec. Some years later it appeared in the north-eastern counties of Ontario, then in other provinces, until at the present time hemorrhagic septicemia has been reported in nearly all the provinces of the Dominion. I am convinced that the disease existed in the Eastern Townships of Quebec prior to 1902, and was then confused with anthrax and black quarter.

There have never been any very serious outbreaks in this country; usually from one to three or four cattle have died on the same farm. Occasionally a more severe form is seen, when eight or ten cattle die on the same premises. Fortunately the disease usually disappears in a short time, and the same farmer may never have any more losses. It is very possible that the cattle which are exposed acquire a natural immunity, which is Nature's way of vaccination, and may protect the animal for the rest of its life. The mortality in cattle which suffer from the disease is very high, ranging from eighty to ninety per cent or more.

There are certain localities where the disease is most prevalent. These localities, low-lying, swampy lands, are favourable to the existence and perpetuation of the virus.

Infection is introduced into the body principally by the digestive tract, sometimes, however, through a wound on the surface of the skin, or on the membranes (mucous) lining the organs inside the body.

RESEMBLANCE TO OTHER DISEASES

The symptoms of hemorrhagic septicemia vary in accordance with the organs which are principally involved.

The disease somewhat resembles, and may be confused with (1) anthrax, (2) blackquarter, (3) cerebro spinal meningitis, and (4) milk fever.

The sudden death of the animal with passage of blood from the natural openings leads one to suspect anthrax.

The swellings sometimes found on the neck, throat, legs and sides in young animals somewhat resemble blackquarter.

The nervous symptoms, as delirium twitching of the muscles, and loss of control of the body, are often mistaken for cerebro spinal meningitis.

Other cases present symptoms almost identical with milk fever.

In some forms of the disease, therefore, it is difficult for even an experienced veterinarian to arrive at a correct diagnosis during the life of the animal. Post mortem lesions, however, are very characteristic in hemorrhagic septicemia, and can be easily distinguished from the above diseases.

SYMPTOMS

First, the animal is rather dull, standing with arched back; the temperature is extremely high, from 104° F. to 108° F., and may suddenly drop to normal. In other cases I have seen a very high temperature just before death, the temperature prior to this being quite normal. Breathing is laboured, pulse quick and very weak, and becomes almost imperceptible as the disease progresses.

The manure is very black (tarry) and semi-liquid, and is accompanied by large quantities of clotted blood, and the animal may practically bleed to death by the intestines. This symptom is almost always present, but much more marked in some cases than others.

The animal will sometimes become delirious, push its head into the manger, stagger around or turn round in circles, finally going down, and will lie in a stupefied condition with the head around towards the flanks as in milk fever; death follows this stage in a few hours.

In other cases there are swellings on different parts of the body, especially in the neck region and the sides. These swellings are flabby and not sensitive. Blood may ooze from the nose and through the skin.

There is very rapid emaciation. A fat animal will become a mere shadow in only a short time. Death usually takes place in from two to ten days; recovery very seldom.

POST MORTEM APPEARANCE

Often-times the first thing noticed on opening an animal is the pale, bloodless appearance of the muscles.

The portions usually affected in hemorrhagic septicemia are the outer (serous) coats of all the internal organs, especially the heart, lungs, stomach, intestines, brain and spinal cord; also the inner or mucous coats of the stomach and intestines. The lesions found resemble blood splashes varying in size from a pin prick to large areas, often giving the organ a black, bruised appearance. These areas (hemorrhagic areas) are usually surrounded by a straw-coloured, jelly-like substance (lymph). On skinning the animal these areas are often found immediately under the skin, and resemble bruises.

TREATMENT

At the present time there is no known cure for hemorrhagic septicemia. A great many drugs have been tried, but nothing has proved satisfactory. Vaccination and serum treatment have proved successful in some cases, but are yet only in the experimental stage.

PREVENTION

A change of pasture; strictly isolate the sick animals and remove them to a place where they can be burned when death takes place. All carcasses should be burned if possible where the animals die, and the stables or other places occupied by sick cattle should be thoroughly cleansed and disinfected.

Hemorrhagic septicemia does not come under the operation of the Animals Contagious Diseases Act, but an inspector is always sent to investigate and offer all the advice and assistance possible.

I am pleased to say that during the last four or five years the disease has greatly decreased in this country.

THE LIVE STOCK BRANCH

THE CANADIAN BANKERS' COMPETITION

ACTING in co-operation with the Dominion Department of Agriculture, Live Stock Branch, the Canadian Bankers' Association is offering cash prizes to boys and girls who exhibit calves or pigs at their local fair and who comply with the following rules governing the competition:

RULES

1. Only boys and girls who have not attained their 17th birthday before the opening day of the show are eligible to compete in the Canadian Bankers' Competition.

2. No entry fee will be charged.

3. No exhibitor shall be allowed to make more than one entry in a class.

4. Not more than one member of a family shall be allowed to compete in a class.

5. An exhibitor who wins a cash prize at one fair shall not be allowed to compete in the same class at another fair.

6. Calves and pigs entered for competition must have been born on or after March 15th, 1917, and must be the property of the exhibitor or the exhibitor's parent or guardian.

7. Grade bull calves, and grade boars, are not eligible to compete, and entries for same must not be accepted.

8. Exhibitors must feed and care for the animals they exhibit for at least six weeks.

9. An application form and a certificate form are attached hereto.

(a) The application form must be properly filled out and fyled with the manager of a local branch bank at least three weeks before the date of the fair.

(b) The certificate must be filled out and signed by the parent or guardian of the exhibitor, and fyled with the Secretary of the Fair not later than the day of the competition. If, however, an exhibitor fails to present his certificate on the day of the competition, he shall be allowed to compete, but any prize he may win shall be withheld until a properly filled and signed certificate is produced, and said certificate must be forthcoming within forty-eight hours after the holding of the competition, otherwise his prize money shall be forfeited.

10. A statement, in writing, signed by the Secretary of the Fair, certifying the names of successful competitors and the prize money won by each, must be procured by the local branch manager at whose branch the general prize money of the fair is paid to competitors, or whose branch, in case the prize money is disbursed in cash by an official of the Fair, is the banker for the official funds of the Fair. The branch manager will, upon receipt of the certified statement, pay the prize money directly to the successful competitors or to the Secretary of the Fair for disbursement by him, according as the general prize money is paid to competitors directly by the bank or to the Secretary or other official of the Fair, taking in either case a receipt on the certified statement.

The receipted statement must be forwarded forthwith, under registered cover, to the Secretary of the Canadian Bankers' Association, National Trust Building, Montreal.

11. In case the winner of a prize is subsequently disqualified, each exhibitor below him shall be moved up one place.

CLASS I.

(Grade bull calves must not be shown).

Calf, Pure Bred or Grade—Prizes:—1st, $5.00; 2nd, $4.00; 3rd, $3.00; 4th, $2.00; 5th, $1.00; 6th, Ribbon.

CLASS II.

(Grade boar pigs must not be shown)

Two Pigs, Bacon Type, Pure Bred or Grade.—Prizes: 1st, $5.00; 2nd, $4.00; 3rd, $3.00; 4th, $2.00; 5th, $1.00; 6th, Ribbon.

It is expected that these competitions will afford especial opportunities for interesting boys and girls and their parents in the bank as an institution as well as bringing forcibly before their minds some idea of the importance of live stock.

In districts where beef cattle predominate it is expected that the prizes will be offered for calves of beef type and in dairy sections for calves of dairy type. In all cases the prizes for pigs will be offered for pigs of bacon type only.

In connection with this competition placards, as shown herewith, together with folders outlining the rules and regulations of the competition have been generally distributed. Already in both Eastern and Western Canada a great deal of interest is being shown by the bankers in making this competition a success and it is felt that the work of the bank managers will mean a great deal in promoting the conservation and improvement of young stock. Six hundred fairs are expected to participate in the competition this year.

DOMINION DEPARTMENT OF AGRICULTURE HONOUR ROLL

FURTHER LIST OF THE EMPLOYEES OF THE DEPARTMENT OF AGRICULTURE WHO HAVE ENLISTED FOR OVERSEAS SERVICE

G. W. McCutcheon, Winnipeg.

CASUALTIES

Pte. F. A. Weldon (killed in action).
Pte. J. S. McLeod (killed in action).

PART II

Provincial Departments of Agriculture

HOME CANNING FRUITS AND VEGETABLES

PRINCE EDWARD ISLAND

BY MISS HAZEL L. STERNS, SUPERVISOR, WOMEN'S INSTITUTES

THE Women's Institute Branch of the Department of Agriculture has encouraged to a great extent the home canning of fruits and vegetables.

Practical demonstrations on the subject have been given by the supervisor to the majority of the women's institutes in the province, and where it was not possible to give a demonstration, lectures were held, and the different processes in canning explained.

Bulletin No. 1, of the Women's Institute Branch, entitled "The Home Canning of Fruits and Vegetables", was distributed to the members of the institutes as well as to all who requested a copy. The bulletin gives clear directions for the canning and preservation of the various vegetables and fruits.

NOVA SCOTIA

BY MISS JENNIE A. FRASER, SUPERINTENDENT, WOMEN'S INSTITUTES

BELIEVING that the time to urge the greater production of food and the correct preservation of the same for one year is to start the year before, we did quite a bit of preparatory work in 1916. At the provincial exhibition held annually at Halifax, the last one being in September, 1916, we arranged a splendid exhibit of vegetables of the many different varieties easily grown in Nova Scotia together with another exhibit equally as good of canned vegetables. These exhibits, shown at the instigation of the women's institute branch, were prepared with great thoroughness by the horticultural department of the College, which department has gone very extensively into the canning of vegetables. The displays proved to be among the most interesting points of the fair and numbers of people, daily, evinced great interest in them. Placards were tacked up all over the grounds, calling attention by striking phrases to the exhibit and to the necessity of growing more vegetables and to the canning of the surplus. Information about the planting and cultivation of the different varieties of vegetables was distributed in the form of leaflets. A comprehensive bulletin entitled "The Cooking and Canning of Vegetables", had been prepared by the writer and Prof. Shaw, Provincial Horticulturist, which also contained a short article on the value of "Vegetables in the Diet". No one was allowed to leave this section of the grounds without the leaflets and a copy of the bulletin. The bulletin has been in such demand that the first edition has been exhausted and a new one is in preparation. In the one now under way the article on "Canning Vegetables" will be enlarged and new articles on "Canning Fruit and Preparing Jellies" will be added.

Since the exhibition last autumn we have not let the subject drop but have taken every opportunity to urge the greater production and the conservation of food, and to encourage more thorough practise of economy and thrift along all lines. At short courses, women's institute meetings and on every available occasion demonstrations in canning, the preservation of food generally and talks on thrift have been given.

At the coming provincial exhibition to be held early in September we intend giving practical demonstrations in canning fruit and vegetables and preparing jellies, which demonstrations will be given on as large a scale and made as practical as possible.

EXHIBIT OF VEGETABLES, CANNED PRODUCTS, ETC., OF THE NOVA SCOTIA AGRICULTURAL COLLEGE

BY L. A. DEWOLFE, DIRECTOR, RURAL SCIENCE SCHOOLS

AMONG our school children, canning has received less attention than it deserves. Fortunately, however, we are improving.

At our rural science summer school, canning is an important feature of our horticultural class. Last year and this year, many students took advantage of the practical work in this subject. Students are allowed to keep their canned vegetables, taking these to their homes and to their schools does much to increase the interest in such work among the people in general.

At the various school exhibitions last fall canned vegetables were not uncommon. Older people asked questions about the methods used, and expressed great pleasure at seeing the schools do such practical work.

Besides the rural science summer school, the domestic science department of the Normal College gives a course in canning. Each year, therefore, about 400 teachers learn something of the work. Possibly one-fourth of this number carry it to their schools.

NEW BRUNSWICK

BY MISS HAZEL E. WINTERS, SUPERVISOR, WOMEN'S INSTITUTES

LAST March a circular letter was sent to all the women's institutes in our province asking them to let us know if they would care for a demonstration on the canning of fruits, meats and vegetables. In response to this letter fifty institutes asked for the demonstration and we have in the field now, two household science teachers giving these demonstrations. We are also endeavouring to supply other societies with demonstrations relating to canning, such as the Housewives' League, various chapters of the I.O.D.E., and Women's Canadian Clubs. As requests keep coming to hand, no doubt at least seventy-five demonstrations will be given before the canning season is over.

NEW BRUNSWICK DOMESTIC SCIENCE TEACHERS IN CONFERENCE AT SACKVILLE, N.B.

These teachers are giving their summer, free of charge, to teaching short course classes in food preservation and conservation

A bulletin, "Modern Methods of Canning", recently prepared by Miss Ada B. Saunders, Assistant Supervisor, is being sent to all members, and to members of other societies upon request.

The women and girls are most enthusiastic over canning this year and I think the results of these demonstrations and distribution of literature will be most gratifying. We have not done such a great deal in our own department, simply because the Department of Education is taking an active part in this work, such as providing demonstrators and forming girls' efficiency clubs, and the women's institutes are promising support to the girls' clubs in making them productive of much good.

In connection with the annual women's institute convention to be held at Moncton, N.B., October 2nd, 3rd and 4th, 1917, we are conducting a canning competition, the rules governing which herewith follow:

1. That only members having paid fees for the current year contribute jars to the Institute exhibit.

2. That no more or no less than twelve jars be included in the exhibit, and no two jars must be alike.

3. That at least five of the fruits, five of the vegetables, and two of the meats be selected from the following:

Fruits:
Strawberries,
Raspberries,
Pears,
Plums,
Peaches,
Cherries,
Blueberries,
Currants,
Rhubarb,
Quinces,
Grapes,
Apples,
Crabapples,
Blackberries,

Vegetables:
Beans,
Peas,
Corn,
Tomatoes,
Spinach,
Mushrooms,
Beet tops,
Beets,
Dandelion greens,
Carrots,
Fiddleheads,
Asparagus,
Swiss Chard,
Pumpkin,
Parsnips.

Meats:
Salmon,
Poultry,
Beef,
Pork,
Game.

4. That only pint jars with glass tops and wire clamps be used.

5. That each jar be labelled with a gummed label provided by the Department free, with the name of contents, name of Institute and date of canning neatly printed thereon, this label to be placed on the face of the jar at the bottom.

6. That the Institute pay express charges to Moncton and if the Department cannot arrange with the railway to give free return transportation, the Institute will pay for same.

7. That each exhibit be carefully packed and the list of contents with name and address of shipper (Institute secretary, etc.), enclosed with exhibit.

8. That if the jars are to be sold and the money forwarded to the Institute, the memo of contents enclosed in exhibit will say so, or if jars are to be returned, this memo will indicate such.

9. That each Institute notify the Supervisor as to entering the competition not later than August 31st, after which date each branch will be informed as to the number competing.

10. That all exhibits be sent by *Express* (when possible), to the Supervisor, Moncton, N.B., not later than September 27th.

PRIZES WILL BE AWARDED ON THE FOLLOWING BASIS

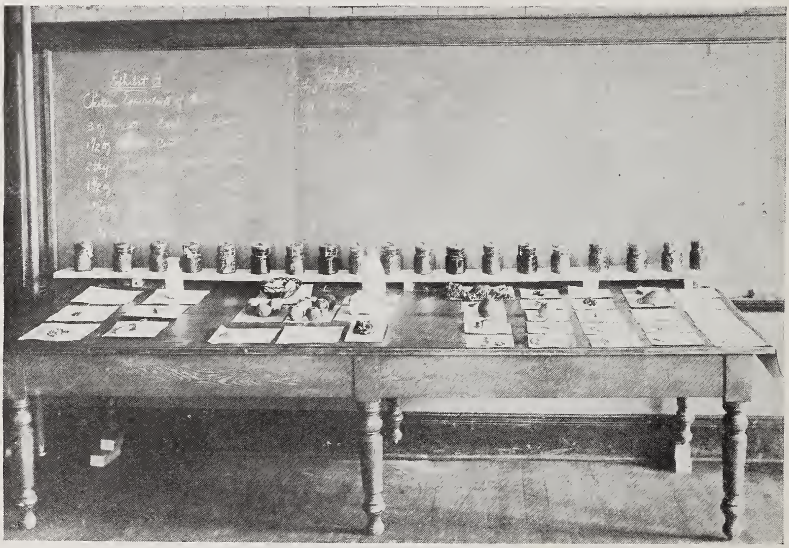
IF FROM	1st Prize	2nd Prize	3rd Prize	4th Prize	5th Prize	6th Prize	7th Prize	8th Prize	9th Prize	10th Prize	11th Prize	12th Prize	13th Prize	14th Prize	15th Prize	16th Prize	17th Prize	18th Prize
85 to 90 Inst.......	$22	$21	$20	$19	$18	$17	$16	$15	$14	$13	$12	$11	$10	$9	$8	$7	$6	$5
80 " 85 "	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	
75 " 80 "	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5		
70 " 75 "	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5			
65 " 70 "	18	17	16	15	14	13	12	11	10	9	8	7	6	5				
60 " 65 "	17	16	15	14	13	12	11	10	9	8	7	6	5					
55 " 60 "	16	15	14	13	12	11	10	9	8	7	6	5						
50 " 55 "	15	14	13	12	11	10	9	8	7	6	5							
45 " 50 "	14	13	12	11	10	9	8	7	6	5								
40 " 45 "	13	12	11	10	9	8	7	6	5									
35 " 40 "	12	11	10	9	8	7	6	5										
30 " 35 "	11	10	9	8	7	6	5											
25 " 30 "	10	9	8	7	6	5												

NOTE.—If less than TWENTY-FIVE Institutes compete no prizes will be awarded, but transportation charges will be paid both ways.

HOME EFFICIENCY CLUBS OF NEW BRUNSWICK

BY FLETCHER PLAROCK, DIRECTOR OF MANUAL TRAINING

As a part of the campaign for greater food production in New Brunswick, the domestic science teachers of the province volunteered in May last to devote their vacation to carrying on short courses in canning and other means of preserving perishable foods, and to do this work without remuneration. In order to facilitate their efforts the Department of Education undertook to organize the girls and young women of the province into home efficiency clubs. The immediate object of these is of course to take care of the present year's increased crop of berries, fruits, vegetables, etc. The organizations are upon a broad basis, however, and it is expected they will become a permanent educational factor in connection with the schools. Girls' clubs in other provinces and states are doing work in sewing, poultry raising, home economics, etc., and these activities will be developed here. Already nearly a hundred home efficiency clubs have been formed, and the organization work is progressing rapidly.



EXHIBITS USED IN THE HOME EFFICIENCY CLUBS OF NEW BRUNSWICK AS A MEANS OF EDUCATION IN FOOD VALUES

DEFINITE OBJECTS OF CLUBS

1. To lead the girls to co-operate in greater production and better preservation of foods.
2. To teach economy and thrift.
3. To teach definite methods of preserving foods, and the use of labour-saving devices.
4. To encourage the utilization of by-products, and the value of home-grown-fruits-and-vegetables, and in the proper rationing of the family.
5 To help the girls to more practical and efficient citizenship.

SUGGESTED REQUIREMENTS

1. Centres or districts maintaining a single department school may form a girls'

club, with only 10 members,—others should have at least 15.

2. Club members should be at least 14 years of age or in Grade VIII, and must agree to follow directions carefully and conscientiously. Each one should grow all the materials possible for canning or otherwise preserving.

3. Each girl must supply her own materials, containers and utensils for the practical work that will be taken up.

4. Each club will have its own president and other officers, who will keep careful records of the work done by the members and report to the Education Department. Forms will be provided.

5. Club meetings should be held monthly, at least. Programmes will be suggested in the literature to be distributed.

6. Each member should keep careful accounts of the coast of materials, containers, time, etc., on forms provided.

7. Each club member should agree to take care of at least 25 quarts of food materials in 1917.

During the second week in July the thirty domestic science teachers volunteers met in convention at Sackville to plan their short courses for the clubs. In this they received very great help from Miss Netta Nixon of the Ontario Agricultural College, whom Hon. Mr. Hanna, Food Controller, provided. Miss White, Miss Peacock and Miss Borden, who have studied and worked with clubs in the States, were also leaders of the conferences. These volunteers are now working through the province, spending four or five days with each club. The demonstration plan is not used. Instead the club members bring their fruits and vegetables to a room provided and inexpensively equipped by the local school board, and this room for the time becomes a canning factory. Vegetables and native fruits are principally used. After four or five days' experience the club members can carry on the work in their own homes for the rest of the season.

In addition to the actual canning, the teacher gives talks on other means of preserving foods, such as drying, salting, etc. She also stresses the necessity for economy, intelligent substitution, elimination of waste, etc., in the use of food. An exhibit showing comparative food values is set up in each community. Each club member must agree to can or otherwise preserve at least twenty-five quarts in 1917. Many have even now doubled this minimum. They all report to the education office, and reports received indicate that the movement is already a great success. At first the club members were encouraged to provide all the canned goods that would be needed in their homes, but many are taking up the work on a commercial basis. Only the most common and inexpensive equipment is used. The wash boiler fitted with a false bottom is the most popular sterilizer, while the lightning top jar is the favourite container.

SHORT COURSE AT THE NORMAL SCHOOL

Falling in line with some American institutions, the New Brunswick Normal School gave up the last week of the spring term to an emergency course in canning and food preservation generally. So that the 500 students in attendance, most of whom will have charge of schools in the province this fall, have had this item of the nation's need brought practically to their attention, and have been trained in the most effective ways and means of assisting to solve the problem of food preservation and economy. They are everywhere acting as missionaries and helpers, and will very greatly help in the success of the Club movement.

MACDONALD COLLEGE

BY MISS KATHERINE A. FISHER, HEAD OF THE SCHOOL OF HOUSEHOLD SCIENCE

THE School of Household Science is co-operating very closely with the demonstrators for rural school work, in the encouragement of greater production and preservation of farm crops, especially among the boys and girls. In connection with this work our demonstrators to homemakers' clubs go out to the schools and give demonstrations to the children in breadmaking and in canning fruits and vegetables. We also send, to each child competing, a copy of our bulletin on canning of fruits and vegetables and one giving directions in breadmaking. We have distributed and are still sending out thousands of these this year, so that each child exhibiting may have definite instructions to follow. Our demonstrators also give, in the schools, demonstrations to mothers and to school children on the question of food for growing children and the noon lunch at school. In doing this we feel that most valuable work in the conservation of the children themselves is being accomplished. In the autumn the school also provides judges for these school fair exhibits.

In addition to this work in the rural schools, we are also working through our homemakers' clubs in reaching the women in the home. Our demonstrators this year are putting forth special efforts in regard to increased production and preservation through demonstrations and lectures in canning and drying of fruits and vegetables and in encouraging the clubs to devote a number of their meetings to a study of food production, better methods in gardening, dairying, and poultry keeping as well as to a consideration of a wider use in the diet of meat substitutes, garden produce and our various Canadian cereals that might partly substitute wheat.

This summer we have had several requests from housewives' leagues and Daughters of the Empire in different parts of the province for demonstrations and lectures in food economy and canning. To these we are responding and it is encouraging to find a rapidly growing interest on the part of the women of the province in the problem of food conservation. Everywhere they are most anxious to receive definite instructions in regard to this problem.

ONTARIO

BY GEO. A. PUTNAM, B.S.A., SUPERINTENDENT, INSTITUTES BRANCH

IN the province of Ontario an active campaign to increase and make available for most profitable use what may be termed garden crops, has been undertaken. This work has been accomplished through horticultural societies, municipal councils, boards of trade, women's institutes, etc. In the early spring a Home Garden competition was organized in connection with the women's institutes. This was described in the April number of THE AGRICULTURAL GAZETTE, page 271. In connection with this each of 64 women's institutes received ten packages of seeds for distribution to their members. Each member was also given a practical bulletin on the raising of the ordinary garden crops. In addition, a large number of speakers were sent out by the Institutes Branch of the Department of Agriculture to address meetings called by institutes, churches, municipalities, and other organizations. A large supply of perishable garden crops being thus assured, the next step was to encourage its conservation. An exhaustive bulletin entitled "The Preservation of Food-Home Canning" has been prepared and sufficient copies printed to supply not only every one of the over 30,000 members of the women's institutes, but others in the province who are likely to apply for it.

While this bulletin is complete and clear in its treatment of the subject which covers fruits, vegetables, eggs and meats, the Department is prepared to supply demonstrators to such organizations as may ask for them.

While the canning of fruit is an art well known to the average housekeeper, there seems to be an urgent demand for more information regarding the canning of vegetables, and meats, and the demonstrators will be prepared to give instruction on these features. Some of the organizations are having two demonstrations during the season, one in late July or early August when the canning of the early fruits and summer vegetables,—beans, peas, spinach, young beets, carrots, etc.—will be taken up, and a late meeting in the latter part of August or in September, for the demonstration of the canning of corn, tomatoes, peaches, etc. In some centres the demonstrations are held for from two to four days, to give every woman and girl in the community a chance to attend. In Brampton, for example, the demonstration was held from Wednesday to Saturday. In one half of the towns the women attend on Wednesday afternoon, the other half on Thursday, the girls of the High School Girl's Club and Girl Guides on Friday afternoon; the factory and business girls on Friday evening, and the women from the district around the town on Saturday. The meetings were advertised in the local press and in many places the clergy, feeling that this step in the way of the conservation of food is a matter of great national importance, announced them from the pulpit.

MANITOBA

BY S. T. NEWTON, B.S.A., SUPERINTENDENT, EXTENSION SERVICE

THIS campaign was really started last year when Miss R. M. Atkinson, one of the extension service demonstration lecturers, took a special course in the canning of vegetables, meats and fruits at Columbia University, New York. Following this, a gardening and canning contest was organized as a part of the boys' and girls' club work, and seeds, the products of which could be readily canned, were supplied to nearly 10,000 club members. Besides this, a large number planted their own seeds.

Naturally, instructions in both gardening and canning were in demand and bulletins were prepared, and an edition of 10,000 canning bulletins was exhausted in less than 60 days, almost 3,000 going outside of the province in response to requests received. A second edition of 10,000 copies is being printed.

In addition, 7,000 canning posters were prepared and exhausted in 10 days.

During the whole year lectures and demonstrations on canning were given by Miss Atkinson, and during July and August it was necessary to employ two additional demonstrators to meet the demand for instruction on this subject.

Each demonstrator takes with her all the necessary equipment with the exception of a coal oil stove, and this article can usually be obtained at each point.

The general equipment includes

PREPARE
THE
PRODUCT

PREVENT WASTE

PACK
AND
COOK

BY

CANNING YOUR SURPLUS PRODUCTS

A FEW FACTS

The world's surplus food is almost exhausted.

The 1916 supply of factory canned food has already gone to the battle front. The 1917 supply is already contracted for. If you want canned foods, you must do the canning yourself.

Millions of dollars' worth of fruits and vegetables are wasted on this continent every year because people do not know how easily any food material may be preserved by the process of canning.

Health and necessity require that vegetables be found more frequently on our tables, in order to free a larger volume of less perishable foods for the use of our Allies.

15,000 Boys and Girls in Manitoba have planted ten tons of vegetable seeds, and are carefully looking after their gardens. They are depending on you to show them how to save the results of their efforts.

You have done well in getting the great crop started; it is equally necessary that it be successfully garnered.

Vegetables and fruits can be successfully preserved by canning. Every family should provide a can of fruit, a can of vegetables and a can of meat for every day in the year.

CANNING THE PRODUCTS

The Cold or Raw Pack Method of Canning is so simple that anyone with an ordinary kitchen equipment may can anything if the directions given below are followed:

1. Choose freshly gathered vegetables or fruits.
2. Wash them.
3. Place in a wire basket or cheese-cloth bag.
4. Dip in boiling water, as follows: Fruit, 1 to 2 minutes; vegetables, 2 to 5 minutes; meat, 5 to 10 minutes.
5. Plunge quickly into cold water for half a minute.
6. Pack into jars or cans. For vegetables, fill with water; fruits, fill with a 3 to 2 syrup (3 quarts sugar to 2 quarts water), and for meats fill with pot liquid. Add one-half teaspoonful of salt for one pint of vegetables or meat.
7. Put tops of jars in place and make almost tight.
8. Place on a wooden rack in the wash boiler, and fill with water until it stands one inch above the tops.
9. Boil as follows—counting from the time the water boils or jumps up and down: Fruit, 12 minutes; tomatoes, 30 minutes; vegetables, 2½ hours; peas and corn, 3 hours; meat, 3 hours.
10. Tighten tops as soon as the jars are taken out of the boiler
11. Label, wrap and store in a cool dark part of the cellar

It is almost impossible to buy cans, and jars have increased in price from 25 to 50 per cent.; hence all patriotic citizens should see to it that every empty jar is filled either by themselves or loaned to their neighbours.

Write to the Extension Department at the Manitoba Agricultural College, or to the Publications Branch, Manitoba Department of Agriculture, Winnipeg, for the New Canning Bulletin

WASH CLEAN

SNIP ENDS AND STRING

BLANCH IN HOT WATER

PLUNGE IN COLD WATER

PACK CLOSELY

DO NOT SEALTIGHT

COOK 2½ HOURS

SEALTIGHT AT ONCE

CANNING POSTER ISSUED BY THE EXTENSION SERVICE, MANITOBA DEPARTMENT OF AGRICULTURE several aluminum dishes and a pail sufficiently deep that when a pint jar is placed in it on a rack the water will come one inch above the jars without overflowing when the water boils. Samples of the various kinds of jars are also taken along. The following is the complete equipment: —1 canning chart; 1 steam cooker; 1 pail; 1 hot pan lifter; 1 pudding pan; 2 plates; 2 funnels; 1 frying pan; 2 knives; 1 brush; 2 spoons; 6 dish towels; 2 pint sealers; rings, cheese cloth, oil cloth.

The total attendance at the various demonstrations will be close on 7,000 by the end of August, while on an average fifteen letters a day are received regarding equipment and methods.

SASKATCHEWAN

BY MISS ABBIE DELURY, DIRECTOR, HOMEMAKERS' CLUBS

WE have not gone about the matter of food conservation in any elaborate way. Perhaps the most effective thing we have been able to do has been the issuing of bulletins bearing on the subject. I say most effective because the propaganda can be made more general through them. These are sent to all our clubs and to other women's organizations and to individuals who make known their needs to us. Also we have been making use of the press to spread knowledge of food economy and production.

At our June convention, where we had 400 delegates representing about 5,000 women, we had valuable talks on the subject and very valuable discussions. Demonstrators are sent out just as they are requested and the demand for canning demonstrations is increasing.

The two bulletins referred to are: "The Value of the Kitchen Garden", and "Preservation of Food". Each of these has been circulated widely.

BRITISH COLUMBIA

BY WM. E. SCOTT, DEPUTY MINISTER, DEPARTMENT OF AGRICULTURE

THE women's institutes throughout this province, since the commencement of the war, have been very active, not only in the way of working to good effect for different patriotic purposes, but also to encourage production and eliminate waste. With this end in view, the Department secured the services of Mrs. Chalmers of Thrums near Nelson; a lady who is carrying out most excellent and successful work along intensive lines of farming and who is also an expert in the putting up and preserving of bottled fruits and canned goods

We arranged an itinerary for all of the women's institutes, numbering fifty-nine; these meetings were very popular and numerously attended by members. Mrs. Chalmers dealt with live-stock on the farm, soils and crops, dairying, poultry-raising, vegetable gardens, preserving and canning of fruits and vegetables. This itinerary appears to be the most successful one ever yet carried out by the Department in connection with our women's institutes work, and I am satisfied that many good results have been accomplished by them.

By means of the excellent talks given by Mrs. Chalmers, our farm women have received very valuable pointers, which will aid them to increase the production of their farms by the adoption of intensive methods of farming. The necessity of thrift and economy was also taken up by Mrs. Chalmers at the lectures, and members were instructed as to how they could best conserve food supplies and make them go as far as possible.

With regard to the supplying of vegetables seeds to our women's institutes, the Department has taken no steps in this connection except by way of encouraging co-operative buying of such seeds, by the institutes themselves, and many of the institutes have done very useful work along these lines.

We have not issued any posters or advertisements direct to our women's institutes, except through the medium of our *Women's Institute Quarterly*, where patriotism, production and thrift have been urged.

With regard to the supplying of demonstrators in canning and the preserving of foods in other ways, in addition to the work outlined by the Department through Mrs. Chalmers, our institutes themselves have been giving demonstrations in the canning and preserving of fruits, vegetables and meats.

The women's institute movement is becoming a very strong organization and there is no doubt but that very valuable work has been done along these lines by them since the commencement of the war.

EFFORTS TO POPULARIZE HOME CANNING

BY JOHN KYLE, ORGANIZER OF TECHNICAL EDUCATION FOR BRITISH COLUMBIA

IN British Columbia a regular war propaganda has been conducted for economy and production, the domestic-science instructors of the various districts, almost without exception, taking a prominent part in the movement. In the cities of Victoria, Vancouver, New Westminster, Nanaimo, Nelson, Vernon, Armstrong and Kelowna, frequent public meetings have been held, and demonstrations freely given showing the public various methods of canning and preserving fruit, vegetables, eggs and fish.

The largest fall fair in the province is held in Vancouver; and there, for the last three years, the domestic-science instructors of South Vancouver and Burnaby municipality have given their services willingly to the public in order to demonstrate methods of preserving fruit and cooking economical dishes. The fruit was supplied by the B.C. Fruit Growers' Association, and systems of preserving, with or without sugar, and with cold water, have been carried out for public inspection.

Needless to say, the work of canning and preserving fruit is carried on extensively in the fruit-growing districts of the province, and much research work is being conducted by the school instructors of domestic science, encouraged and assisted by the members of the women's institutes.

Co-operative canning societies are being formed in various districts, and thus individuals may have the use of a canning equipment having commercial capacity. As a rule cans are manufactured locally, and a clever home-canning equipment for sealing is made by a firm in Vancouver, so that the local product may be put on the market having a thorough professional appearance. At the coast a specialty is made of preserving fish, and great success has attended efforts in this direction. The Victoria Whaling Company entrusted one of the domestic-science instructors with the work of experimenting on the cooking of whale meat, and the results have been eminently satisfactory. Preparation and methods of cooking have reduced the objectionable features to the minimum, and much good will undoubtedly result from the work accomplished. Just as the prejudices of the public had to be overcome before the dog-salmon and hump-backd salmon became common articles of diet, so it is believed that whale meat will gradually take its place on the table when the public becomes assured of its wholesomeness. The meat is equal in dietary quality to the best beef, and can be purchased at one-third the retail price. These two facts warrant serious effort being made to popularize it.

During the coming season, increasing attention will be devoted to everything pertaining to the great essentials which will result in economy and production.

GARDENING AND CANNING COMPETITION FOR GIRLS

BY L. H. NEWMAN, B.S.A., SECRETARY, CANADIAN SEED GROWERS' ASSOCIATION

IN the spring of 1915 a Gardening and Canning Competition, open to girls between the ages of ten and eighteen years of age, living on farms in the county of Carleton, Ont., was inaugurated. This competition was continued in 1916 and again in 1917. The objects of this contest are as follows:—

1. To aid in the general movement for the re-construction of education for rural districts by providing a practical medium of instruction in elementary horticulture and agriculture in rural schools.
2. To create a new interest in Mother Earth and show what she is capable of doing if properly handled.
3. To provide instruction in the growing and canning at home of our leading vegetables and small fruits.
4. To arouse an increased interest in the preparation of better food, especially for winter months, all of which makes for better living and better health.

RULES OF CONTEST

Each competitor was required to operate a garden of as nearly one-twentieth-acre in area as she might find convenient. After the ground was prepared for planting the competitor was required to do all the work herself and to keep a record of work done. Certain plants, namely, raspberries, carrots, onions, beets, tomatoes, peas and beans were required to be grown, but others could also be included, if desired. The plot of each competitor was to be inspected and judged during the growing season and the score awarded taken into consideration in making the final awards. Each competitor was also required to send an exhibit entirely the product of her own garden to the county fair in September, when they would again be judged. A written report or essay was also required of each competitor and the marks allowed on this report together with those awarded at the county fair and on the condition of the garden determined the final award.

The sum of $100 was offered by Mr. R. B. Whyte of Ottawa to be divided among all girls in the competition winning 200 points out of 300. Mr. Whyte also sent each competitor free of charge, forty raspberry plants.

The results obtained during the past two years of this competition have been most gratifying. In spite of the very unfavourable season of 1916 some of the girls had really excellent gardens, which went to prove that even the worst sort of weather conditions may be overcome to a great extent by thorough work and intelligent application.

PRINCE EDWARD ISLAND

O. P. V. ENSILAGE

BY W. J. REID, B.S.A., DIRECTOR OF AGRICULTURAL INSTRUCTION

THE growing of oats, peas and vetches as a combination crop for various purposes has been receiving the attention of stockmen in various parts of the Maritime Provinces for a past number of years.

As a hay crop the combination has met with favour throughout Prince Edward Island, and has given excellent returns in that capacity, but last season was the first trial of the crop for ensilage purposes. The hope is that it will prove to be a reliable substitute for corn which is the universal ensilage crop, but which is an uncertainty over the greater part of the three Eastern Provinces.

A field of approximately four acres belonging to the Rev. P. C. Gauthier of St. Louis was sown with a combination of 2½ bushels oats, one-half bushel peas, and one-half bushel vetches per acre. The crop was of a luxurious growth, and was cut when the lower part of the plants began to change colour, or when the grain was in the dough stage. An estimate would place the yield at 10½ to 12 tons per acre, green weight. It was then put through an ensilage cutter and packed firmly into a stone silo, which was erected just before cutting. On inspection at periods ranging from two to six months after cutting, the ensilage was keeping in prime order and proved to be exceedingly palatable for dairy cows. Owing to lack of facilities the ensilage was not tested for dry matter content, but from the results obtained at the Agricultural College, Truro, Nova Scotia, the combination crop tested 8 per cent higher in dry matter than the corn crop of the same year.

That O.V.P. ensilage will receive greater attention from feeders of this province can be accepted as final. Although the investigational work of ensiling and feeding the crop has been of recent origin and confined to a few localities, the feeling that it can receive a widespread adoption is felt by the majority of the prominent feeders.

A debatable point with many feeders is the kind and cost in connection with the erection of a suitable silo. A cement, stone or brick silo is usually accepted as being the most reliable for all purposes where any of the three materials is easily available, but for ordinary purposes the stave silo gives commendable results. In the instance cited, a stave silo, 20 ft. high and 12 ft. in diameter, was erected. The material was 2″ x 6″ scantling, planed inside with the edges bevelled. A cement foundation and roof were included, and all at a total cost of approximately $60. When it is known that a stave silo when properly erected can be used for thirty years, as is proven by authentic records, the original cost does not seem large. Then the quality of the feed that it has for use is such that a silo becomes an important addition to the farm equipment when once it is adopted.

NOVA SCOTIA

THREE VARIETIES OF APPLES ORIGINATED IN NOVA SCOTIA

BY P. J. SHAW, PROVINCIAL HORTICULTURIST

THREE varieties of apples worthy of mention have originated in Nova Scotia. The first is the Banks' Red Gravenstein, or Banks. This apple originated as a bud sport of the Gravenstein on the farm of the late E. C. Banks of Waterville, Kings Co., N.S. It was first noticed and propagated by Mr. Banks about 1880. It is much the same as the Gravenstein in season and flavour, but is less ribbed, more regular in shape, and far more highly coloured. On account of its brighter colour it sells better than the ordinary Gravenstein. It has been quite largely planted in Nova Scotia.

RED RIBSTON

The Red Ribston was also noticed as a bud sport of the Ribston on the farm of Mr. A. S. Banks about 10 years ago. When scions from this branch were grafted into other trees they produced Ribston Pippin apples except that they were solid red in colour.

RED KING

The Red King was found on the farm of Mr. Enos Thorpe, Lakeville, Kings County, N.S., a few years ago. Its origin is unknown, but it is believed to be a bud sport of Tompkins' King. It is so highly coloured that persons well acquainted with the King have failed to recognize it by its appearance as King. It has all the qualities of King, except that it is much more highly coloured. This apple has been grafted, and the grafts reproduce the red colour of the parent.

Mr. A. S. Banks also reports a sport of the Banks which is much redder in colour than the Banks. This is being propagated, but is not bearing this season.

QUEBEC

AGRICULTURAL EQUIPMENT FOR SCHOOLS

BY JEAN-CHARLES MAGNAN, SUPERINTENDENT OF SCHOOL GARDENS

FORMERLY, agriculture was taught in the schools only by means of agricultural text books, save for a small number of teachers who took the trouble to prepare object lessons with a very rudimentary equipment. It is gratifying to note to-day that considerable progress has been made in this direction.

When inspecting school gardens, we note that the teachers, acting upon the recommendation of the provincial Department of Education and the Department of Agriculture, are beginning to form agricultural school museums, including material and objects necessary for a good elementary teaching of agriculture. For instance the forty-seven domestic science schools of the province have already done excellent work in this direction. Most of these schools have a suitable equipment for teaching practical lessons on dairying, poultry keeping, horticulture, arboriculture, etc. This equipment, which includes several instruments, is the property of the school and is used only for practical demonstrations or object lessons.

Among primary schools quite a large number of academies, rural schools and colleges are well equipped to give proper teaching in agriculture. For instance, I observed during my visits that several schools have the following equipment: a hand sower with accessories, a few spades, rakes, hand hoes, weeding, cultivating and watering tools for the garden, a wheel-barrow, a spray pump for fruit trees, a pruning knife, a pruning saw, grafting knives, etc.

It is gratifying to note also that agricultural school museums have been formed in increasing numbers in our schools for the last two years.

Such museums are composed of the following: collections of grains and grasses, etc., collections of useful plants, of weeds, of different soils, explanatory tables of varieties of vegetables, fruit trees, domestic animals, etc.; we also find some catalogues and magazines representing the principal farm implements, rural construction, etc.

All this cheap material is installed in a wooden cupboard with shelves, placed in one of the school rooms.

These museums have been organized by school boards, by the staff of the schools, or by the District Representatives of the Department of Agriculture. In each case private initiative has done its share.

NOTES

AGRICULTURAL EMPLOYMENT BUREAU

A bureau has been established by the Honourable J. Ed. Caron, Minister of Agriculture, to supply farm workers and encourage the "back-to-the-land" movement. From the beginning of April to the middle of May, 200 farmers have been put in touch with more than 300 workers, who seemed to have the necessary qualifications. Over 200 farms are offered for sale or for exchange, at very fair terms. This new organization of the Department of Agriculture enables the farmers to secure the workers that are still available in some cities.

There are three branch offices in the following cities: Quebec, Montreal, Sherbrooke.

DEMONSTRATION FIELDS

Fifty-eight demonstration plots were established this spring in the various districts of the province. They include the following crops: corn for ensilage, beets, swede turnips, clover grown for seed, beans, wheat, barley, potatoes, alfalfa and carrots.

FRUIT TREES

Some 40,000 fruit trees, including 36,000 apple trees, were distributed last spring through the horticultural societies. If this movement continues, the province of Quebec will soon occupy a very important place in horticulture.

FRUIT CROPS

According to information received up to the present, the next crop of apples will show a decrease of 35 per cent as compared with last year. A full crop is expected, however, in the county of Two-Mountains. Plums and cherries are very plentiful in the district of Quebec.

YOUNG WOMEN'S CLUBS (CERCLES DE JEUNES FERMIERES)

Courses in domestic science will be given this year under the auspices of women's clubs by the teachers of the Department of Agriculture. These courses last four days, with two sessions per day. They include the following subjects: sewing, mending, food, lodging, house planning, sanitation, canned foods, agriculture for women, etc. There is an attendance of 300 to 500 women and girls in each place.

Three new women's clubs have put themselves under the control of the Department of Agriculture: the clubs of Maria, Bonaventure county, Three Rivers and LaPrairie.

THE QUEBEC HOUSE KEEPERS' LEAGUE

This league, which has been organized recently, is making rapid progress, and its work is being encouraged by all classes of society. It will not only look after the material welfare of the members, but it will also develop their intellectual qualities for the good of the family and of the home.

One of the objects of this league will be to encourage the families to make a thorough and rational study of their budget, to purchase in co-operation the necessities of life and to make a study of foods, so as to be able to replace those that have become too expensive by other and cheaper ones.

ONTARIO

PRINCIPAL APPOINTED FOR KEMPTVILLE AGRICULTURAL SCHOOL

W. J. BELL. B.S.A., has been appointed Principal of the Kemptville Agricultural School, which appointment took effect Sept. 1st. Although the main building operations are not being proceeded with this year, there is a great deal of preliminary work which will require the attention of the Principal in the meantime. Contracts have been let for a live stock judging pavilion, which will be available for short courses during the coming winter. Farm buildings are also being erected and those already on the premises improved, and a splendid herd of dairy cattle is being assembled. The Principal will therefore have an opportunity of guiding these operations and laying the foundation for a successful opening of the school at the conclusion of the war.

Mr. Bell has had training which qualifies him admirably for the posi-

W. J. BELL, B.S.A.
Principal, Agricultural School, Kemptville, Ontario

tion which he is assuming. He was born in Wellington County, and spent his boyhood in Wellington and Dufferin counties. Graduating from Orangeville high school and Toronto normal school, he spent a number of years teaching as Assistant Principal of the Orangeville model school and Principal of the Arthur public school and St. George's school, Guelph. Subsequent to this he spent four years in business life in Toronto and Western Canada. Later he took a course at the Ontario Agricultural College, from which he graduated in 1915. Since then he has been Live Stock Specialist in the Institutes Branch of the Ontario Department of Agriculture and lecturer on Breeds and Breeding at the Ontario Veterinary College. In this work he has been in many sections of the province, and is very familiar with conditions. He is recognized as a specially good live stock man, and his training in this line as well as in teaching should be most useful.

The Kemptville School is being financed entirely under THE AGRICULTURAL INSTRUCTION ACT.

THE CO-OPERATION MOVEMENT

LAMBTON COUNTY

BY W. P. MACDONALD, B.S.A., DISTRICT REPRESENTATIVE

IN Lambton county there are fifty-three farmers' clubs. These clubs are community centres at which farm business is transacted. Social evenings are held when topics of the day and topics of the farm are discussed and debated. The raising of funds for Red Cross purposes and other patriotic works is a work each club undertakes by holding lawn socials and picnics during the summer months. The advantages to be gained by close co-operation, both financially and otherwise, have been plainly evident to the farmers of the county.

With the organization of more clubs the need was felt for a central organization to advise and assist local clubs and co-ordinate their efforts along social, economic and business lines. In response to this need the Lambton County Co-operative Association came into existence. For the purpose of the incorporation of this association under the Ontario Companies Act, letters patent were applied for and granted.

Each member of each farmers' club at the time of uniting with the Lambton County Co-operative Association gives to the association a promissory note, payable on demand, and renewed every three years, for the sum of twenty-five dollars. The said note is used as collateral security for the transaction of the business of the co-operative association. Any member may demand the return of his note by giving thirty days written notice to the secretary of the co-operative association. Collateral in the form of notes has been secured to the extent of $15,000. At the annual meeting each member has only one vote.

The co-operative work undertaken by the association up to the present has been entirely the buying of farm supplies in car-lots, such as binder twine, sugar, salt, potatoes, fertilizers wire fencing, cement cedar posts and coal. A business manager was engaged four months ago. Under adverse business conditions a turnover of $31,000 of business has taken place. Plans are now being worked out to grade, buy and sell all products of the farm. All products sold under the name of the association will be sold on a graded and quality basis.

LEEDS COUNTY

THE co-operative movement in Leeds county had its inception in the year 1912 when one egg circle was organized at Lansdowne. This organization, however, owing to lack of educational propaganda and local objections soon became defunct. A short time later this egg circle was reorganized and since that time the movement, with the support of Mr. W. H. Smith, B.S.A., District Representative of the Ontario Department of Agriculture for Leeds county, has made steady and rapid progress.

Early in the year 1915 pure-bred poultry associations were formed at Athens and Lyn for the purpose of improving poultry and poultry products with a view of securing a higher market price for poultry and eggs. In addition to securing an improved market for eggs, a market was secured for eggs for hatching purposes and for pure-bred poultry for breeding purposes, and eggs for hatching were supplied to members at a reasonable price. The flocks of all association members are inspected by Dominion Government poultry experts, as quality as well as quantity is demanded by the association.

Previous to the organization work done at these centres, an educational propaganda, consisting of egg-candling demonstrations and meetings held throughout the county in aid of the co-operative movement, was conducted through the office of Mr. Smith. As a result of this, the various organizations with centres at Lansdowne, Caintown, Lyn and Athens, were linked together into a selling organization to handle eggs and poultry with executive at Lansdowne.

Following this there was organized the Leeds County Farmers' Co-operative Association, Limited, with an authorized capital of $10,000, divided into 400 shares of $25.00 each. The prospectus states that the Leeds Farmers' Co-operative Association, Limited, has been formed for the purpose of encouraging the production of good quality farm products among the members and others and for securing the best markets available for such products. It is proposed to handle eggs, poultry, hogs, calves, cream and other farm commodities as the business warrants and as the members decide. In the egg trade, it is the present intention to handle new laid eggs only. Under this association, farm products will be marketed from Lansdowne, Lyn and Athens, but the business will be all handled by the one executive with one business manager and a local manager at each point.

In addition to the associations mentioned, independent egg circles are in operation at Crosby and Lyndhurst. However, it is the aim to have the entire county organized into the central organization and doing business under one business manager. In this way Mr. Smith believes that the individual shipping points can take the initiative in various lines of business, but the whole volume of business done will be kept account of through the central association. This means that in the county, all organization work will be in unison, controlled by a systematic body having different phases of operations, systematized and conducted along uniform lines.

Working in harmony and in conjunction with the Leeds County Farmers Co-operative Association, Limited, is the county Board of Agriculture, the executive of which endeavours to deal with problems arising through the co-operative associations, and to furnish the association members with the educational material required to achieve the greatest success along the lines of endeavour undertaken.

The association, in addition to handling poultry products, has purchased many carloads of feed and grain, clover and grass seed, corn and potatoes.

The work of the egg circles has gradually developed from the selling of eggs to the selling of poultry as well and to the establishment at Athens and Lansdowne of poultry-fattening stations. The method of operation followed is that the birds when bought, are paid for, then fed and fattened, sold, and the profit, over and above the expenses of operation, returned to the association members. This is the method also followed in the handling of eggs and other products. These fattening stations have made rapid progress. Four years ago at Athens, forty birds were fattened and sold. During the winter of 1916-17, four hundred birds or over were handled. In addition to the crate fattening of birds, live poultry, consisting mainly of old hens, was sold at a time when the market demanded them, thus securing for the members the highest market price. The following figures reveal the progress made in this work, using the Lansdowne centre as example:

	Gross Receipts for Eggs	Gross Receipts for Poultry
1913......	$1,850.71	$ 94.80
1914......	5,513.99	316.16
1915......	8,505.76	2,661.65
1916......	17,207.63	....

While the gross receipts for 1916 were not available, there was in that year, $6,184.03 paid to members by the association for poultry. The cost of fattening the poultry purchased amounted to $834.70. The receipts from this amount of business, at an approximate estimate, would be equal to an increase of one-fifth of the produce price, plus the cost of fattening.

The following table deals with eggs only and shows in a pronounced manner the financial value accruing to the members through co-operative methods:

STATEMENT OF BUSINESS HANDLED IN 1916

CENTRE	Eggs Shipped, Dozens	Gross Value	Net Value	Store Value
Athens	11,401	$ 3,669.16	$ 3,325.32	$ 2,866.89
Lansdowne	51,494	15,327.26	13,286.19	12,511.39
Lyn	2,356	671.50	631.74	590.63
Total	65,251	$19,667.92	$17,243..25	$15,968.91
Net returns over store prices $1,274..34, or 7.9 per cent.				
Crosby	4,124	$ 2,529.80	$2,327.06	$2,299.17
Lyndhurst	15,048	3,874.19	3,503.79	3,490.67
Total	19,172	$6,403.99	$5,830.85	$5,789.84
Net return over store prices $41.10, or 8 per cent.				
County	84,423	$26,071.91	$23,074.10	$21,758.75
Net return over store prices $1,315.35.				

IN OTHER COUNTIES

The co-operative movement among the farmers is developing rapidly in many parts of the province. Following are extracts from weekly reports of District Representatives that have been received by the Department of Agriculture at Toronto:

HALDIMAND COUNTY

G. H. Woltz:—

Considering the ever-increasing demand for alfalfa seed grown in this district, I devoted a portion of the week endeavouring to get the principal growers in the locality of Windecker to organize themselves into a Seed Producer's Association. While a co-operative organization is not an easy thing to organize in this district, I believe we will be successful in organizing these seed producers, thus materially raising the standard of seed produced and putting the work on a more sound, economic basis.

A Horse Breeders' Association has been organized at Hagarsville under the presidency of Charles F. Howard and a strong directorate, all of whom are breeders of Clydesdale horses.

The Caledonia Junior Farmers' Association has taken a step in the co-operative purchasing of supplies. At the close of a meeting recently held, orders were given to the secretary by members for thirty-two bushels of kiln-dried seed corn.

ALGOMA COUNTY

A. S. Smith:—

I have been able to inform a great many farmers where they could secure seed. I also located a supply of lime at the steel plant where it is available free of cost. I arranged with farmers beyond hauling distances to secure some carloads of this material which will cost about twenty-five dollars per car delivered. Heretofore these farmers could not secure lime for less than seven dollars per ton.

PORT ARTHUR

L. M. Davis:—

Quite a number of our farmers this year have co-operated in the buying of clover seed which was secured direct from the Kenora Co-operative Clover Seed Association. I induced a seedsman to order a carload of seed oats and organized the farmers in purchasing these, giving the seedsman a profit of five cents per bushel.

HASTINGS COUNTY

A. D. McIntosh:—

The Banner Oats Association disposed of 2,500 bushels of oats for seed purposes and several hundred bushels of other kinds of grain besides clover and timothy seed. The sales were entirely among farmers, some of whom belonged to other counties.

OXFORD COUNTY

G. R. Green:—

I was asked by a representative of the Live Stock Branch at Ottawa to assist in securing three carloads of grade Ayrshire cows. This order was promptly turned over to the secretary of the Southern Counties Ayrshire Breeders' Club, who in the course of a few days had one carload of the cattle in sight. The club officers hoped to be able to fill the rest of the order by the time that the cattle were required.

YORK COUNTY

J. C. Steckley:—

The Farmers' Club at Aurora ordered a carload of seed potatoes which I have assisted them in selling co-operatively.

The first annual sale of the York Holstein Breeders Club was held at Richmond this spring. The average price paid was $175 for cows and calves.

TIMISKAMING BRANCH

W. G. Nixon:—

The Hagarsville Junior Farmers had an interesting session, over sixty being present to hear the address by F. C. Hart on Co-operative Marketing. This association has won quite a name for itself in the work of co-operative buying supplies but it is now their intention to do some selling as well. This association has a membership of fifty or more, all of whom have signed a note for twenty dollars, which is to be given as security in the transaction of business. The work of the Hagarsville Junior Farmers is having great influence upon the farmers in the district.

THUNDER BAY

G. W. Collins:—

On May 1st our co-operative auction sale of cattle was held with four hundred people in attendance. Holstein cows were most in demand. One grade cow and her calf sold for $166 and another for $150. Forty-three head of cattle, including some beef type animals of cows, two-year-olds and yearlings brought a grand total of $3,830.

CAMPAIGN OF ADVERTISING

BY JUSTUS MILLER, ASSISTANT COMMISSIONER OF AGRICULTURE

AN extensive advertising campaign has this year been inaugurated and carried out by the Ontario Department of Agriculture. The aim of the campaign is to take the results of the work and findings of the various officials of the Department to the farmer in such a way that they will carry conviction, help him in his farm operations and finally bring the desired action which will result in up-to-date methods being followed and in the production of greater and better farm produce.

THIRTY-TWO ADVERTISEMENTS IN SERIES

In planning the details of the campaign much the same procedure was followed as in the case of a commercial advertising campaign. The Ontario farm press was chosen as the logical medium. Contracts were signed for thirty-two back covers of each of six weekly journals, twelve front covers of one monthly publication and twenty-four inside pages of another monthly—all to be used by the end of twelve months, when the contracts expired. Provision was made also for extra pages, if events should warrant more advertisements than those originally planned, and for such limited space as might be used in those journals of a semi-agricultural nature. Although a writer in the Department prepares the advertisements for the press, an advertising agency was brought in to handle the contracts, suggest page lay-outs, and do all routine work. This arrangement with the agency has proven very satisfactory. Another feature which has given excellent results from the first is a monthly conference of the editors of the Ontario farm press with the Commissioner of Agriculture. Topics treated in the advertisements—agricultural problems, indeed, of all kinds—are thoroughly discussed at these informal meetings and a ground for common action laid down. As a result much good has resulted both for Department and press and a close sympathy and helpful co-operation have been developed.

LITTLE ADVICE—MUCH INFORMATION

In preparing each advertisement the ordinary rules of style and make-up are observed, while two essentials are insisted upon, without which it is felt the advertisements would fail—a knowledge and appreciation of the farmer's viewpoint, and the publication of timely and practical information. It is fully recognized that the same, progressive Ontario farmer has very efficiently adapted his business to his circumstances, that his problems are grave, and that he is quite as patriotic and has served the cause quite as faithfully as has any other class. The ideal striven for is to present accurate figures and reliable facts, to explain as accurately as possible the tendency of markets, to summarize best farm methods; to give, in short, the most practical information available, just when the farmer is likely to want it—and to leave it to his own good judgment to what extent his peculiar, controlling conditions warrant him to apply it. In the fullest possible degree, it is sought to make plain that the idea underlying the advertising campaign and the spirit dominating the work is one of true appreciation of the farmer and his work, and of sympathetic helpfulness.

PERSONAL POINT OF CONTACT STRENGTHENED

In the narrow compass of an advertisement, however, it is not always possible to give very detailed information upon the subject considered. Hence all readers are invited to write the Department of Agriculture directly for more complete information. So that topics for correspondents may be suggested to readers a summary of the chief points discussed are given, when possible, with an invitation to write at once for full details concerning any or all of them. The results, thus far, have been gratifying indeed. Many hundreds of inquiries have been received. Immediately they come in they are turned over to the expert in the Department by whom they would naturally be answered and the information is forwarded at once. This form of extension work is of the very greatest value, as it tends constantly to strengthen the point of personal contact between the farmer and the Department.

The scope of the advertisements upon the programme may be classified under five heads:

(1) The best information obtainable, considering all aspects of the situation, of the various lines of farm industry. In each case present conditions and future probabilities are as thoroughly discussed as the prevailing unsettled conditions permit.

(2) Information concerning the business of farming and most approved farm methods. Summaries are given largely, in this connection, just when the information is most valuable. In a few cases information of especial interest to the housewife is given.

(3) Ways of rendering the critical situation caused by abnormal world conditions less acute are discussed. Such pressing problems as the labour shortage, the greatest practicable utilization of machinery, etc., are the themes of these advertisements.

(4) Advance summaries of bulletins to be published. The idea here, of course, is to place the summarized results of important experiments, or of compilations of valuable information, before the farm public just when it is most urgently required.

(5) Information which can be obtained from the Ontario Department of Agriculture. The object is to acquaint each farmer in the province with the kinds of information he may secure by writing the Department, and just to whom he should write for it. Farmers are urged to preserve these advertisements as a sort of yearly help calendar.

SUBJECTS THAT ARE TREATED

The subjects thus far treated in the campaign have been: the labour situation, value of good seed and proper soil preparation, the horse, dairy, sheep, poultry, apiary and fruit industries, desirability of selling wool co-operatively, advantages of the annual pasture mixture, importance of pure-bred sires, provincial assistance given in draining land, home canning of fruits and vegetables, practical information available at the Ontario Agricultural College, principles of successful marketing and benefits of co-operation, preparation for the 1918 crop and the benefits of, and methods to ensure, pure water on the farm.

The tentative programme for the remainder of the campaign is as follows, in the order given: extension work of the Ontario Department of Agriculture, Ontario Agricultural College advertisement, principles involved in organizing a successful co-operative society, the sheep industry, information available from the representatives of the Department, the beef industry, the Ontario agricultural bulletin service, the bacon industry, O. A. College short courses, bacteria—friends and foes, fertilizers, butter grading, preparation for spring crops, preparing for poultry production, farm power, and water systems for the farm home. This programme may be changed at any time of course, or a greater number of advertisements may be published, as the general situation warrants.

As was before stated these advertisements are published in six weekly and two monthly agricultural publications. They were begun in the last week of March, 1917, and the present contracts expire in March, 1918. The combined circulation of all is approximately 170,000. Thus it can better be understood what a tremendous influence the advertisements may exert, reaching simultaneously, as they do, all the best farmers in the province.

RESULTS ARE THE PROOF

Just how they compare in effective appeal with the most successful commercial advertisements cannot, at present, be determined. But that will be known at the termination of the campaign. An accurate record is being kept of the cost of each advertisement and the number of replies received. These will be compared later with costs and replies in the case of business firms advertising on a large scale and in the same mediums. As in each case the greater benefits of advertising are indirect the comparison will show, approximately at any rate, the relative appeal of commercial and agricultural advertising. Until that time nothing definite can be said. Yet results thus far have been sufficiently encouraging to warrant the belief that later records will prove agricultural advertising equally as effective—and in point of value received, equally as profitable —as any other kind of advertising carried on in our farm journals to-day.

SHORT CUTS FOR INCREASED FARM REVENUES

THE above is the title of a leaflet that, during the past year, was prepared by Mr. E. P. Bradt, B.S.A., District Representative of the Ontario Department of Agriculture in Dundas County, printed on the office duplicator, and mailed on the 1st and 15th of each month to the young men in the county who have taken the four to six weeks' course in agriculture. As there are now over one hundred young men in the county who have taken these courses, this method was taken to keep in direct touch with them. The following is an index of the subjects treated in the leaflet during the year:

INDEX TO SUBJECTS AND ISSUE

1. Agricultural Meetings:			
(a) Importance of Attending	Vol. 1,	Dec. 15,	No. 1
2. Dairy Cattle:			
(a) Herd Records	" 1,	Nov. 15,	" 1
(b) Winter Feeding of	" 1,	Dec. 1,	" 2
(c) Method of working out balanced rations	" 1,	Dec. 15,	" 3
(d) Fresh Milch Cows, Feeding and Management	" 1,	Mar. 15,	" 8
(e) Avoid turning Cattle out too Early in Spring	" 1,	May 1,	" 9
(f) Summer Feeding of	" 1,	Aug. 15,	" 16
(g) Calves, Proper Care in Summer	" 1,	Aug. 15,	" 16
(h) Stabling during Cold Fall Nights	" 1,	Oct. 15,	" 18
3. Farm Book-keeping:			
(a) A System Shown and Explained in Detail	" 1,	Jan. 1,	" 4
4. Farm Management:			
(a) System Outlined for a 100-Acre Farm	" 1,	Jan. 15,	" 5
5. Farmer's Garden:			
(a) Plans and Varieties of Vegetables to Grow	" 1,	Feb. 1,	" 6
6. Farm Machinery:			
(a) Storing and Care of	" 1,	Nov. 15,	" 1
7. Farm Crops:			
(a) Grain, re Cutting Green for Feed	" 1,	June 15,	" 12
(b) Hay, Time to Cut, Methods of Curing, etc.	" 1,	June 15,	" 12
(c) Corn, Cultivation of	" 1,	June 15,	" 12
(d) Timothy Seed, Methods of Growing and Harvesting	" 1,	Aug. 1,	" 15
(e) Clover Seed, Methods of Growing and Harvesting	" 1,	Aug. 1,	" 15
(f) Clover Seed, Methods of Threshing	" 1,	Aug. 15,	" 16
(g) Miscellaneous Crops, Millet, Rape, etc.	" 1,	June 15,	" 14
(h) Corn for Ensilage, Proper Maturity	" 1,	Sept. 15,	" 17

8. Grasshoppers:			
(a) How to Control	Vol. 1,	July 15,	No. 14
9. Poultry:			
(a) Poultry Pointers for Fall and Early Winter	" 1,	Nov. 15,	" 1
(b) Mating up the Breeding Pen	" 1,	Mar. 15,	" 1
(c) Importance of Removing Male Bird	" 1,	June 1,	" 11
(d) Summer Feeding of	" 1,	July 1,	" 1
(e) Handling of Pullets for Winter Layers	" 1,	Sept. 15,	" 17
(f) Fattening Chickens	" 1,	Oct. 15,	" 18
10. Seeds and Seeding:			
(a) Importance of Seed Selection with Results	" 1,	Mar. 1,	" 7
(b) Work of the C. S. G. A.	" 1,	Mar. 1,	" 7
(c) Seed Corn	" 1,	Mar. 1,	" 7
(d) Information re Methods of Seeding	" 1,	May 1,	" 8
(e) Seed, Importance of Sowing only Plump Grain	" 1,	May 1,	" 9
11. Spraying:			
(a) Quantities of Material to Use, Time of Application, etc., for Fruit Trees	" 1,	May 1,	" 9
(b) Quantities of Material to Use, Application of Spray, etc., for Potatoes	" 1,	July 1,	" 13
(c) Orchard and Garden Notes	" 1,	June 1,	" 11
12. Sheep:			
(a) Fitting lambs for Market	" 1,	Oct. 15,	" 18

MANITOBA

DAIRY IMPROVEMENT EFFORT IN NORTH-WESTERN MANITOBA

BY W. R. ROBERTS, DISTRICT REPRESENTATIVE, BINSCARTH

INSTANT response to the call sent forth to have cows tested for butter-fat production would be expected when the simplicity of the operation has been demonstrated. This, however, is not the case in this district, where there are five creameries in operation, one of which claims the largest output of any country creamery in the province.

The farmers of to-day who ship cream find it a very remunerative undertaking, yet they will not take the time to weigh and test the milk of individual cows, so as to improve the herd. Inherent indifference is responsible. With the object of breaking down this indifference, a circuit — seventeen schools — was made in October, 1916. This circuit was covered monthly. The children were instructed how to keep milk records, and how to do the testing for the percentage of butter-fat in a given sample of milk. No less than 500 pupils actually did the work themselves. In this way the parents are reached through their children.

To encourage the pupils still further, they were asked to enter a contest in milk testing, and while the response was not very large, about twenty are doing the work now. This is promising, providing that it is followed up. Those who entered were supplied with composite sample bottles and preservative which they fill during the month. At the end of the month the testing is done with a four-bottle hand tester.

It was found that four-bottle hand testers are adaptable for this kind of work, as the pupils can work in a group of four. Three of these testers are as many as one instructor can supervise effectively. Usually the room in which the work is done is a small laboratory with a limited space. The only essential requisite at the school is hot water. During the winter months when the furnaces are going this is not a task

Additional lectures were given on milk and cream from the standpoint of bacterial growth. The component parts were shown separately so that an intelligent grasp may be obtained by each pupil in how to prevent abnormal multiplication of bacteria. That souring is due to bacterial life, and that this will take place more readily at certain temperatures, arouses a desire to do things more carefully, and more important still that pathogenic germs may find admittance to the milk under insanitary conditions is more forcibly impressed on the mind of the pupil. This leads to the need of pasteurizing suspected milk before using.

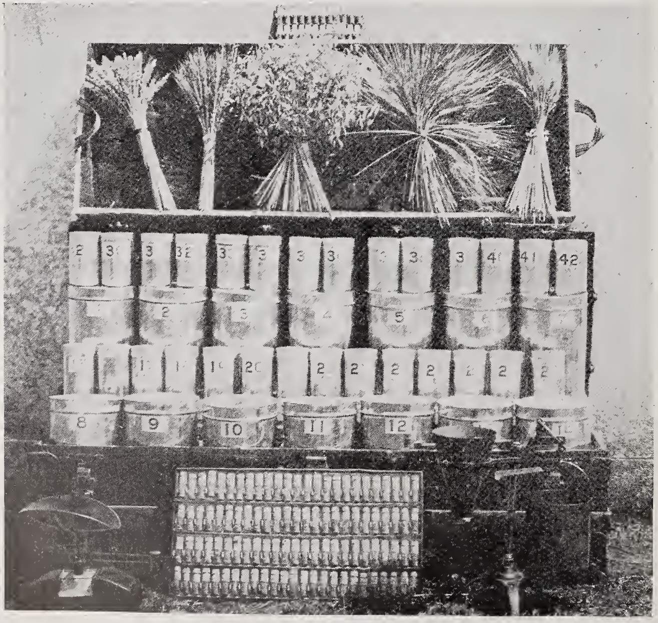
EQUIPMENT FOR DEMONSTRATION WORK

BY J. H. KITELEY, FIELD HUSBANDRY DEPARTMENT, MANITOBA AGRICULTURAL COLLEGE

THE following is a list of the articles included in each of the cans which go with the Manitoba field husbandry short course demonstration trunk. Three of these trunks are used, as the short course work is arranged in three circuits, and the same material goes to about six short courses. The trunk is probably fifteen inches longer than an ordinary trunk and permits everything to be in sight, with the result that an instructor can obtain any material desired without any trouble.

The case in front of the trunk is one of the collections sent out by the Dominion Department of Agriculture.

The large cans in the illustration are about ten inches long and seven and a half inches wide; the smaller ones are six inches long and three inches wide.



FIELD HUSBANDRY EQUIPMENT TRUNK
This material is used by the Extension Service for Demonstration purposes

SMALL SAMPLES

Fodder Crops:

1. Red Top.
2. Rye Grass.
3. Timothy.
4. Brome Grass.
5. Meadow Fescue.
6. Kentucky Blue.
7. Canadian Blue.
8. Sweet Clover.
9. Alfalfa Grimms.
10. Alfalfa Turkestan.
11. Siberian Millet.
12. Hungarian Millet.
13. Common Millet.
14. North-West Dent.
15. Longfellow Corn.
16. Gehu Corn.
17. Minnesota (13).
18. Field Peas.
19. Alsike Clover.
20. White Clover.
21. Red Clover.

Oats:

22. Gold Rain.
23. Victory.
24. Orloff.
25. Black Victor.

Wheat:

26. Einkorn.
27. Durum.
28. Emmer.
29. Spelts.
30. Club.
31. Polish.
32. Alaska Wheat.

Corn:

33. Preston.
34. Stanley.
35. Huron.
36. Blue Stem.

Barley:

37. Beardless Barley.
38. Hulless Barley.
39. Weed Seeds, mixed.

Flax:

40. Premost.
41. Bolly.
42. Golden.

LARGE SAMPLE

Wheat:

1. Marquis.
2. Red Fife.
3. Prelude.
4. Marquis.
5. White Fife.

Oats:

6. Abundance.
7. Banner.
8. Daubeney.

Barley:

9. Two-rowed.
10. Six-rowed.
11. Six-rowed.
12. *Flax.*
13. Spring Rye.
14. Fall Rye.

APPARATUS

1. Seed tester.
2. Score cars—Wheat, Oats, Barley, Flax, Grass.
3. Paper for note work.
4. Paper plates for grain judging.
5. Complete set of Field Husbandry bulletins.
6. The following bulletins:—
   Weeds and Weed Seeds.
   Smuts in Grain.
   Canadian Seed Growers—Report and Regulations.
7. Weed Seed Collection in case.
8. Sheaves of following grains marked on sample sheets—31 sheaves.
9. Six small tripod microscopes.
10. One large microscope.

SASKATCHEWAN

ACTIVITIES OF THE DEPARTMENT OF AGRICULTURE

DRY FARMING CONGRESS, PEORIA, ILLINOIS

THE Department of Agriculture has decided to pay return transportation charges on exhibits of merit from Regina to the International Soil-Products Exposition to be held in connection with the Dry-Farming Congress at Peoria, Illinois, U.S.A., from September 18 to 29. Special cash prizes are offered by the exposition for threshed grain, grain in sheaf, forage plants in sheaves or bales and other soil products.

BRAND ALLOTMENTS INCREASING

DURING the past year the allotment of new horse and cattle brands showed a considerable increase over those allotted in 1915 There were 1,356 cattle brands allotted, being an increase of 304, while the horse brands allotted were 707, which is an increase of 67 for 1916. In addition to this volume of business there were dealt with in the brand office 90 applications for the transfer of brands; 24 changes in the designs or positions of brands originally allotted; 22 searches and extracts were made from the brand registers, not including 8 free searches and extracts made for members of the Royal North-west Mounted Police. The number of cattle brands renewed in 1916 was 494, being an increase of 148 over the previous year. The number of horse brands renewed during the same period was 427, being an increase of 21 over the previous year.

WINTER RYE

THE Department of Agriculture has purchased a quantity of North Dakota No. 959 winter rye to supply to Saskatchewan farmers. This seed is put up in two-bushel lots, which is enough to sow 2½ acres, and two bushels will be delivered at any station in Saskatchewan for $4.

The reasons why, in the opinion of the Department, this crop should be grown in Saskatchewan are as follows:

1. It is effective in eradicating wild oats.
2. It furnishes better pasturage in late fall and early spring than any grass or other grain.
3. If grown for "hay" it yields abundantly and insures a supply of feed in seasons of drought.
4. It largely aids in preventing drifting of summer fallow and restores fibre to loose soils.
5. It is rust and drought-resistant and is seldom affected by frost.

EXCURSIONS TO THE COLLEGE OF AGRICULTURE

THE farmers' excursions to the College of Agriculture at Saskatoon, extending from July 9 to 14 inclusive, were attended by about 2,200 persons. Lunch was served by the University to their guests in the judging pavilion, where an address of welcome was given each day by President Murray, and also short addresses by Mr. S. E. Greenway, Director of the Extension Department, by Dean Rutherford, and by Professors Bracken and Shaw. After these addresses the people were taken to the experimental field, where they broke up into small groups, each in charge of an instructor in field husbandry. Then they were taken to the stock farms, where some 300 head of pure-bred sheep and pigs, and 100 head of pure-bred cattle, mostly of the dairy type, were presented for their inspection. The poultry plant, the mechanics' building, and the greenhouses were also visited, after which the party dispersed to examine the rest of the University buildings. The same programme was followed each day. As an indication of how much these excursions were appreciated, it may be mentioned that the only district served in former years by an excursion train was the country from Turtleford to North Battleford, and in each year there was an increase in the number attending, until this year 575 passengers were brought to the College.

EXHIBIT AT THE REGINA EXHIBITION

THE Department of Agriculture has a high reputation to maintain for its exhibits, and its display at the Regina exhibition was fully worthy of this reputation. Most of the exhibits had formed part of the equipment of the Better Farming train, which recently toured the province. All of the contents of the Field Husbandry car, nearly all of the poultry, and a large part of the farm machinery displayed on the train were arranged in a tasteful and attractive manner in this exhibit. In addition there was an instructive section showing the perennial sow thistle, its methods of growth and propagation, and the recommended means of eradication.

FARM BOYS' CAMP

One feature of the fair in which the Department of Agriculture is particularly interested is the Farm Boys' Camp, which was held this year for the third time. This camp stands as a monument to the originality of the late Lieutenant H. N. Thompson, formerly Weeds and Seed Commissioner. The great value of these camps has been so thoroughly proved and generally recognized that there is no doubt that a Farm Boys' Camp will be a permanent feature at all future exhibitions. This year there were some 250 boys in attendance, some fifty rural municipalities or agricultural societies being represented, the whole being under the control of Mr. J. G. Raynor. Every moment of the boys' time from morning till night was taken up by judging competitions, lectures, demonstrations, or inspecting the exhibits. Recreation was not neglected, but was ably attended to by Mr. McLeod of the local Y.M.C.A. staff. Many of the professors of the College of Agriculture greatly assisted in the daily programme of lectures, and the boys were also addressed by Mr. F. H. Auld and others.

THE WOOL EXHIBIT

The main idea in the wool exhibit, as prepared by the Co-operative Organizations Branch, was to show not only the various classifications and grades, but to illustrate the best methods of handling, so as to secure the advantages to both producer and buyer. The bad effects of the use of insoluble paints, the deteriorating effect of the use of binder twine, the injurious effect of shipping wool while wet, or allowing it to become damp subsequently, were all exemplified. Two large cases were shown containing samples of fleeces of the most important Canadian breeds, together with other samples illustrating character and staple.

CATTLE FOR DISTRIBUTION

A noteworthy feature was the exhibit of a number of grade heifers, which were samples of the animals being supplied to farmers under the Live Stock Purchase and Sale Act. There was a constant stream of visitors inspecting these animals and literature and information was given regarding the Department's plan for supplying live stock on credit terms. It is now possible to secure 10 grade heifers and a pure bred bull for a cash outlay of about $350, with plenty of time for the balance, and interest at only six per cent.

THE DAIRY EXHIBIT

Owing to military requirements it was not possible for the dairy exhibit to secure quarters at the fair grounds. At the cold storage warehouse, however, there was a really excellent display. One hundred and thirteen different lots were shown, and the creamery butter in particular was very uniform. Hon. Mr. Motherwell's silver trophy for the highest average score in creamery classes went to the Carlyle Dairy of Calgary. The championships for the different provinces for the winners of the highest total score in the three creamery classes were: for Saskatchewan, Geo. H. Carter, Moosomin; for Alberta, Carlyle Dairy Co., Calgary; for Manitoba, Crescent Creamery Co., Winnipeg.

THE DESTRUCTION OF GOPHERS

BY M. P. TULLIS, ACTING WEEDS AND SEED COMMISSIONER

THE destruction of gophers in Saskatchewan by poisoning has not been successful in reducing their numbers to any great extent throughout the province generally. This is due particularly,—first, to lack of community co-operation in distributing the poison at the proper time, and, second, improperly prepared bait. With a view to overcoming the loss from the lack of co-operation a Gopher Day was suggested. May first was decided upon, as this date was considered early enough in the season to destroy the gophers before the young appear and before any new growth would be far enough advanced to be more palatable than the poisoned food.

Municipalities, farmers' organizations and school teachers were asked to bring about general observance of the day. Responses were received from quite a number of municipal councils indicating that they were alive to the seriousness of the gopher pest and in some cases stating that bounties were being offered of from 1 to 2½c. for each tail secured. A number of the municipalities put up special prizes to encourage the boys and girls to help in the work of destruction. The Department offered 36 bronze shields and 36 bronze medals for competition among the school children. For the purpose the province was divided into 37 divisions of about 8 municipalities each and a bronze shield was presented to the school district with the highest points in each of the 36 of the divisions. The school in the other division standing highest in the whole province got a silver shield. Points were allowed for the average as well as for the aggregate number of gophers destroyed. This gave schools with a small number of children in attendance an equal chance with the others. The boy or girl in each of the 36 of the divisions who presented the largest number of tails to the teacher up to the evening of May 1st got a bronze medal. To the boy or girl highest in the province a gold watch was presented by Mr. F. H. Auld, Deputy Minister of Agriculture.

Gutenberg S. D., near Tramping Lake, was the winner of the silver shield with a total of 7,632 gophers destroyed, while Master Christian Reiter of the same school was the winner of the gold watch with 2,092 gophers. Quite a number of boys and girls in the province ran a close second, having secured nearly 2,000 tails. Nine hundred and eighty schools entered the competition and a total of 514,140 gophers were reported destroyed or an average of 524 per school.

The half million gophers destroyed by the children this spring is equal to two and a quarter millions in July or August and calculating that each gopher destroys ten cents worth of grain per season this means that the boys and girls of Saskatchewan saved over $200,000.

Realizing the value of the help of the children a Junior Agricultural Service League is being organized into which about 4,000 children will be admitted to membership. To qualify the children are asked to destroy 50 gophers. When 200 are destroyed a member is admitted to the third rank. Five hundred allows admission to the second rank and 1,000 to the first rank. A bronze medal will be given November 1st to the boy or girl standing highest in the league in each division as outlined by the gopher competition. A silver medal will be given to the one standing highest in the province on that day.

BETTER FARMING TRAIN

BY W. W. THOMSON, DIRECTOR, CO-OPERATIVE ORGANIZATION BRANCH

SASKATCHEWAN'S fourth annual Better Farming train completed a very successful itinerary on Saturday, June 30th. The eleven cars used for lecture and demonstration purposes were placed at the university siding, Saskatoon, early in the last week of May and all the equipment was installed by June 2nd. On Monday, June 4th, the train commenced its journey, which covered the Loverna and Battleford branches of the Grand Trunk Pacific Railway, also the Grand Trunk Pacific main line from Bradwell to Melville, and then transferring to the Canadian Pacific lines covered the Regina-Arcola branch; the Estevan branch from Gainsboro west, and the Soo Line from Estevan to Drinkwater. All told the train made stops at alternate points over 750 miles of railway and was visited by upwards of 19,000 persons during the four weeks that it was on the road.

THE BETTER FARMING TRAIN

The train differed from those operated by the Department in previous years in two important points. 1st,—the rolling stock was supplied jointly by the two railways over which it operated, which obviated all necessity of transferring equipment when changing over from one railway to the other, and, 2nd,—a much larger equipment of demonstration material was carried and more time devoted to the explanation of the exhibits than formerly.

The train consisted of the following sections which we will briefly describe in the order named. Live stock section, poultry section, machinery, buildings and dairy section, boys' and girls' section, crop production section, household science section, and nursery section.

The live stock section occupied two large machinery cars and two flat cars with canopy roofs. The machinery cars were used to house a comprehensive display of both beef and dairy cattle. A pure-bred Clydesdale mare was also carried on one of these cars. One of the flat cars was divided into pens to carry sheep and swine, and the other flat car was used as a platform on which to display the live stock for demonstration purposes. Prof. W. H. J. Tisdale had charge of the live stock work and was ably assisted by Messrs. H. Sommerfeld and W. A. Kirkpatrick, two ex-students from the provincial College of Agriculture.

The poultry section occupied a day coach from which all seats had been removed. A portion of the car was fitted up as a model poultry house and this was contrasted with another part fitted up to illustrate the very poor accommodation frequently reserved for the poultry on many farms. Representative specimens of the breeds of poultry most suitable for Saskatchewan were shown, some in the houses above described and others in coops carried for the purpose. An incubator was shown in operation, and also a brooder. A number of chickens were shown in a fattening crate, and demonstrations were given in proper methods of killing and plucking chickens and in candling eggs. Prof. R. K. Baker had charge of this section, and he and his assistants, Messrs. E. Lloyd, V. S.

DEMONSTRATION IN TYPES OF CATTLE
The car is used as a demonstration platform

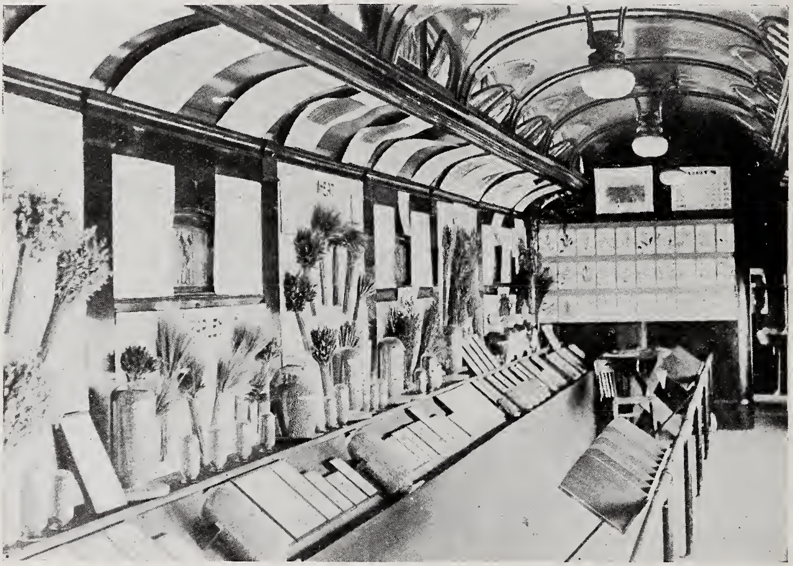
Asmundson, and J. E. Kratzert, were kept very busy explaining the equipment and discussing poultry problems.

The mechanic, building and dairy section occupied two large express cars. The equipment consisted of model farm buildings, designed to show conveniences in arrangement and combined with a proper system of lighting and ventilation. Two electric lighting plants suitable for farm use were shown in operation, as was also a gasoline engine fitted up with a line shaft to drive a churn, washing machine, cream separator, etc. Several cream separators, a Babcock milk tester with scales and other equipment for keeping records of milk production, also sanitary milk pails, cream cans, etc., were shown in the dairy section. Prof. J. MacGregor-Smith had charge of the mechanical section. Prof. K. G. Mackay demonstrated with the dairy equipment and discussed dairy problems with the visitors, while Messrs. MacKenzie and E. C. Jarvis explained the other equipment.

THE STAFF OF THE BETTER FARMING TRAIN
Front Row—Left to right: Mrs. Jean Archibald, Miss H. Genry, Miss C. Murray, Miss Gillespie, Mrs. L. E. Kirk, J. E. Kratzert. Kneeling: John Cameron, Prof. R. K. Baker, W. Thompson. Standing: Prof. J. McSmith, Mr. Jarvis, John Rayner, Prof. T. N. Willing, E. A. Lloyd, Jno. McKenzie, Mr. Summerfeldt, C. Morrison, Mr. Bradshaw, Mr. Cox, Mr. Hanson, Prof. J. Tisdale, Mr. Mutch

The boys' and girls' section occupied a day coach which had been fitted up so that it could be used for illustrated lectures and for motion pictures. Prof. F. W. Bates, Director of School Agriculture for Northern Saskatchewan, was in charge of this department and was assisted throughout by F. Bradshaw, Chief Game Guardian for the province, who gave very interesting lectures on the bird life of Saskatchewan, and on questions connected with game preservation. The motion pictures put on with a Pathescope machine were another interesting and instructive feature. The films used were largely travel scenes, showing scenery in various parts of Europe, Africa and America. Two natural history films were also used, and the programme was usually concluded with a comic feature.

The crop production section, which was naturally one of the most important departments of the train, was also housed in a day coach from which all the seats had been removed. Exhibits of desirable varieties of all of the important field crops grown in the province were tastefully displayed, and a plentiful supply of placards and photographs with suitable inscriptions served to impress important cultural truths on the minds of visitors. The display was divided into three sections, one for cereals, one for fodder crops and one for weeds, each in charge of a demonstrator especially qualified to deal with his particular subject. The demonstrators discussed problems in connection with their work in a conventional way with persons who visited the car. Lectures on cultural matters and on farm machinery and buildings were given as in former years in a lecture car; but this year a special effort was made in all departments to impart information by having the demonstrator in charge of exhibits answer individual queries. Prof. John Bracken was in charge of the field crops section, and was assisted throughout the itinerary by various members of the Field Husbandry staff of the Agricultural College.



THE CROP PRODUCTION CAR

The household science department occupied a day coach. A large platform had been erected at one end, and on it were shown a number of up-to-date household conveniences, such as the latest thing in coal-oil stoves, a convenient refrigerator for a farm home, a convenient form of kitchen sink, and an improved mangle for laundry purposes, etc. Mrs. Jean Archibald was in charge of the women's department, and gave lectures on questions connected with home lighting, heating, ventilation, etc. Miss Gladys Henry, her assistant, gave demonstrations on the preparation of deserts and other culinary matters. The programme in this section also included lectures on poultry raising and dairying by Professors Baker and Mackay.

The nursery section occupied another day coach from which practically all of the seats had been removed, and which was fitted up with a slide, a sand box, and a plentiful supply of toys. The object of this section was to provide a safe place for parents to leave small children while attending the lectures in other parts of the train. This feature seemed to be much appreciated, and the car was well patronized at every stop. The ladies in charge were Mrs. L. E. Kirk, Miss J. Gillespie and Miss Christina Murray.

Two points were visited each day, and identical programmes were put on at each place. The following is an outline of the regular morning programme:—

9.00 a.m.—Train open for inspection of visitors.

9.30 a.m.—All visitors assembled at the live stock car and the Department's representative in charge of the train briefly explained the objects of the train and how it had been provided, including assistance received from the railway companies, and the College of Agriculture.

9.40 a.m.—A short lecture particularly for the boys and girls on types of cattle.

10.00 a.m.—Lectures for women commence in the household science car and continue until 12.00 noon. Boys' and girls' lectures commence in the lantern car. Men remain at the live stock car until 11.00 a.m. for further lectures on live stock.

11.00 a.m.—Men go to car provided for the purpose where lectures are given on field husbandry from 11.00 to 11.30 a.m. and on farm mechanics from 11.30 to 12.00. At this hour the boys and girls commence a tour of inspection of the display cars and return to the lantern lecture car at 11.45 for motion pictures. From 12.00 to 1.30 p.m. the entire train is open for examination and explanation of display material.

Mr. J. G. Raynor, District Representative of the Department in the Battleford district, was in charge of the train throughout and reports a most satisfactory itinerary. The attendance was: men 6,050, women 4,586, children 7,333, and infants 1,870. This large attendance was doubtless due to the cumulative effect of the advertising of other years, together with the fact that the train was undoubtedly the best equipped for its purpose which the Department has ever sent out.

The operation of this train is made a possibility through the provisions of The Agricultural Instruction Act.

PART III

Rural Science

NURSERY STOCK FOR SCHOOL PLANTING

NOVA SCOTIA

BY L. A. DEWOLFE, DIRECTOR RURAL SCIENCE SCHOOLS

THE question of a nursery to supply shrubs and other plants for school grounds is worth pushing.

Thus far in Nova Scotia we have none. The Agricultural College grows a considerable quantity of shrubbery for its own use; but it has not given any to schools. There is not sufficient ground under control of the Education Department to grow material for distribution. Our Normal College has less than two acres of ground, with no chance to enlarge its area.

From the other provinces we hope to learn some method of supplying our schools with desirable material without having to buy it from private nurserymen.

NEW BRUNSWICK

BY R. P. STEEVES, M.A., DIRECTOR ELEMENTARY AGRICULTURAL EDUCATION

WE have no provincial schools nursery. The trees and shrubs that have been used for beautifying school grounds have in the past been obtained from local sources—from the forest or from the grounds and gardens of interested citizens. In only a few cases, so far as I am aware, has purchase been made by the trustee boards.

Within recent years, as introductory work, this Division has supplied school districts in which our work is being specially taken up with shrubs and vines as samples. We have thus hoped to encourage both teachers and trustees in a desire to make greater use of this way of increasing interest in school-ground improvement.

This year, through the kindness and courtesy of Mr. W. W. Hubbard, Superintendent of the Dominion Experimental Station, Fredericton, over three hundred excellent specimens of flowering shrubs have been distributed to our schools. I have reason to know that these are greatly appreciated.

I think the schools nursery an excellent idea that should greatly promote beautification of school grounds. When our agricultural schools get into regular service and sufficient land is available at one or both for this purpose, I have no doubt but that the schools will wish to avail themselves of the opportunities such a nursery would afford.

ONTARIO

BY J. B. DANDENO, Ph.D., INSPECTOR OF ELEMENTARY AGRICULTURAL CLASSES

THERE is no special provision made in Ontario to supply nursery stock of forest trees or shrubs for the ornamentation of school grounds. Where school boards are desirous of obtaining such material, they are expected to secure it either from near-by woods or swamps, or from regular nurseries. Where the schools are maintaining classes in agriculture, a portion of the grants apportioned to the board for equipment may be used to purchase trees, shrubs, or perennials. In schools where agriculture is not taught (the subject is optional) according to the prescribed regulations of the Department of Education, no financial assistance is received for this purpose.

MANITOBA

BY R. FLETCHER, DEPUTY MINISTER

FOR some years past we have received annually a considerable number of trees from the nurseries on the Experimental Farm at Indian Head. These we have distributed, free of cost, to school boards in districts where the ground had been cultivated the previous year at least, and, therefore, there was some chance that the material would thrive. We have just reached the stage where we can supply considerable material each year from the nursery at our Normal School grounds at Brandon.

BY B. J. HALES, B.A., LL.B., PRINCIPAL OF NORMAL SCHOOL, BRANDON

FOR some years past there has been some distribution of nursery stock by the province, but it was largely material received from the forestry nurseries at Indian Head or from other sources. For the last year or two we have supplied a part of it. In connection with our forestry instruction in the Normal School, we have found it necessary to grow a considerable number of trees and shrubs, while in our horticulture we have found it necessary to grow quantities of herbaceous perennials. This year it was decided that all the distribution should be from the Normal School, and that it should be confined to material of our own growth. As part of the old arrangement I received a shipment of seedlings from Indian Head, but they were not distributed this year. We planted them in our own nurseries and will have them for future distribution.

In order to reach the teachers and school boards we inserted in the February copy of the *Western School Journal*, published in Winnipeg, the following announcement:—

> "The Department of Education will be prepared, next Spring, to distribute a limited quantity of trees, shrubs and herbaceous perennials to those schools which have grounds in a condition for planting. This material has been raised on the grounds of the Brandon Normal School in connection with the instruction in gardening and forestry, and as it must be removed to make room for further work, it is being distributed free to schools, the school district paying the express. The distribution will be made directly from the Normal School in Brandon and all applications should be addressed to the Principal.
>
> "The quantity of material available for distribution in the spring will be con-

ditioned somewhat upon how it stands the winter. Under ordinary conditions it should be about as follows:

TREES AND SHRUBS

375 Manitoba Maples, 3 ft. high.
500 Manitoba Maples, 2 ft. high.
600 Lilac, 2 to 3 ft. high.
250 Laurel Leaf Willow, 2 ft. to 3 ft. high.
500 Golden Willow, 2 ft. high.
50 Russian Poplars, 5 ft. high.
2,500 Caragana, 2 ft. high.
20 Red Elder, 2 ft. high.
300 Virginia Creepers, last year's cuttings.
Cuttings of willow and poplar can also be supplied where desired.

FORESTRY NURSERY, NORMAL SCHOOL, BRANDON, MANITOBA

HERBACEOUS PERENNIALS

300 Dahlias.
600 Golden Glow.
100 Anthemas.
300 Sweet Rocket.
100 Columbines.
100 Larkspurs.
300 Scarlet Lychnis.
20 Bleeding Hearts.
100 Bridal Robe.
100 Gypsophila.
500 Variegated Ribbon Grass.
300 Campanula Compacta.

BIENNIALS

100 Sweet Williams.
500 Pansies.
300 Dianthus.

"To avoid confusion, both in ordering and filling the orders, the perennials and biennials will be made up in a number of standard collections and each school may order the collection of biennials and one of the perennial collections. As there is always more or less uncertainty about this class of material wintering well the composition of the collections cannot be definitely promised, but so far as conditions will allow, the following collections will be distributed:

NO. 1. BIENNIALS

10 Sweet Williams.
5 Pansies.
3 Dianthus.

NO. 2. PERENNIALS

10 Iceland Poppies.
3 Dahlias.
2 Ribbon grass.
2 Shasta Daisies.
3 Achillia, white.
2 Golden Glow.

NO. 3. PERENNIALS

1 Bleeding Heart.
2 Golden Glow.
5 Larkspur.
5 Dwarf Campanulas.
1 Gypsophila.
5 Columbine.
5 Scarlet Lychnis.

NO. 4. PERENNIALS

3 Anthemas.
3 Bridal Robes.
2 Larkspurs.
1 Golden Glow.
5 Scarlet Lychnis.
1 Bleeding Heart.
2 Columbines.
2 Dahlias.
2 Ribbon Grass.
5 Sweet Rocket.

"There can also be supplied about forty bushels of choice seed potatoes of the following distinct varieties:

American Wonder.
Carman No. 3.
Bovee.
White City.
May Queen.
Honey Eye.
Crown Jewel.

These will be distributed in five-pound lots.

"School Boards or teachers requiring any of this material would do well to put in their applications as early as possible as all orders will be filled in the order received and there might not be sufficient available material for all."

In answer to this announcement orders poured in, and at the proper time the trees and shrubs were distributed on the terms indicated therein. The quantities mentioned in the announcenemt were intentionally kept somewhat below what we were able to supply in order that the requests might not too much exceed our supply.

We distributed to 127 elementary and high schools throughout the province about 9,000 trees and shrubs, 1100 willow and poplar cuttings, 189 collections of herbaceous perennials or biennials, and 32 bushels of seed potatoes. We have restocked our nursery with seedlings and cuttings, and will be in a position to distribute at least an equal quantity next year.

It will be seen that this work with us is merely in a stage of growth. There will be some changes in detail perhaps next year, but the distribution will no doubt be along the same lines and carried on in much the same way as this year. I am convinced that this is a department of school work which is capable of very great development, and am glad to know that similar work is being done in other provinces, because that will stimulate effort here. It was begun with us purely as a by-product of our Normal School work, but with little expense we can make it an integral part of our effort.

The only condition necessary for a school to receive this material is that it has ground prepared for the planting. We are anxious, as far as possible, that this material should find its way into the poorer schools, and a gratifying feature of this year's work is that a large percentage of the schools to which distribution was made were in the outlying districts of the province.

SASKATCHEWAN

BY A. W. COCKS, B. SC., DIRECTOR OF SCHOOL AGRICULTURE

MOST of the rural school grounds in the southern part of Saskatchewan are desolate and uninviting in appearance. In most cases no attempt has been made to improve conditions, and with the exception of the school building there is nothing to indicate any effort on the part of man to change the natural appearance of the prairie. Although the cultivation of trees and shrubs is a fairly simple matter, yet this fact is not generally known, and many school trustees and ratepayers on the prairie are of the opinion that it is useless to attempt to establish windbreaks, shelter-belts, or tree plantations.

Recognizing the necessity for more beautiful surroundings for the schools, the Directors of School Agriculture made arrangements in 1915 with the Chief of the Tree Planting Division, Forestry Farm, Indian Head, and with the Provincial Nurseries, Regina, for the free distribution of trees and shrubs to school districts. The school officials are asked to properly cultivate the ground, to make application for trees and shrubs at least a year before planting, and to submit a complete statement of the work done on the land, a plan of the school grounds and an agreement to properly care for the trees and shrubs after planting. Applications are forwarded and the above information supplied to the Directors of School Agriculture, who, by inspection of the ground or otherwise, will satisfy themselves that the ground has been properly prepared before forwarding the list of applications to the Forestry Farm or the Provincial Nurseries.

By means of lantern slides illustrating the possibilities of tree planting on the prairies and by the distribution of circulars published by the Department, considerable interest in the improvement of school grounds has been aroused. Usually, however, it is found that there is a tendency to attempt to obtain results too quickly. On the prairies of Saskatchewan two seasons should be devoted to the preparation of the ground, the second season being devoted to deep summer fallowing.

In the spring of 1916, 54 school districts were supplied with trees from the Forestry Farm, Indian Head, and 18 with shrubs from the Provincial Nurseries, Regina. In the spring of 1917 trees were forwarded to 56 school districts, while 25 schools received shrubs.

ALBERTA

BY JAS. C. MILLER, B.Sc., Ph.D., PROVINCIAL DIRECTOR TECHNICAL EDUCATION, DEPARTMENT OF EDUCATION

THERE is no special provision for supplying nursery material for planting on school grounds in this province, apart from the Dominion Experimental farms at Indian Head, Lacombe and Lethbridge. The C.P.R. nursery at Cluny and Archie Mitchell's nursery at Coaldale furnish much of the material used.

There is need for further provision along these lines, and a more active forestry policy in the Prairie Provinces.

BRITISH COLUMBIA

A PROVINCIAL SCHOOLS NURSERY

BY J. W. GIBSON, M.A., DIRECTOR OF ELEMENTAEY AGRICULTURAL EDUCATION, VICTORIA, B.C.

IN 1914 the Department of Education for British Columbia adopted a policy whereby school boards wishing to undertake a scheme of school grounds improvement would receive financial assistance as well as free advice and a supply of ornamental trees and shrubs. For several years the Provincial Government had been supplying ornamentals for the beautifying of its own public grounds in various parts of the province, and for this purpose had established a large nursery in connection with the grounds of the Mental Diseases Hospital at Essondale, adjoining the Government farm. As in other places so it was found here that this horticultural work and the new and healthful interests associating with it had a most beneficial effect on the men engaging in it. On the other hand, it made possible the production of large quantities of valuable trees and ornamental shrubs at a very low cost.

In the fall of 1914 it was found that the supply of nursery stock on hand was more than sufficient to meet the needs of grounds in connection with provincial public buildings, and it was decided to make donations to school boards entering into an agreement with the Department of Education. This agreement provided for the complete planning, grading, draining, surfacing and planting of the school grounds, and was included as part of the work of the Director of Elementary Agricultural Education. In two years in the neighbourhood of sixty school grounds have been planned and most of the improvements carried out, including the planting of native trees as well as many beautiful horticultural varieties supplied from the schools' department of the Provincial Government nurseries.

A CORNER OF THE PROVINCIAL NURSERY

As it takes from five to ten years to raise most varieties of trees to a size fit for permanent planting, a movement was made in the spring of 1915 to provide for larger future demands by starting many of the best varieties of Canadian trees from seed, and also in 1916 by purchasing at a very low cost several thousand three and four-year seedlings which were set in the nursery and will be available for distribution from year

A VIEW OF THE PROVINCIAL NURSERY, ESSONDALE, B.C.

to year whilst the younger seedlings are coming on.

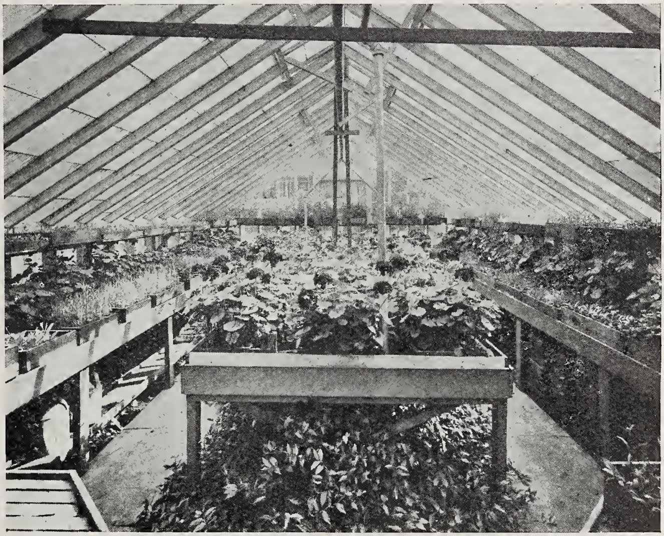
It is the intention of the Department to give more attention in future to the propagation of the best trees and shrubs which are native to British Columbia, not only in the provincial schools' nursery at Essondale, but also in other parts of the province. To this end a campaign has been started in the schools of the province with a view to interesting the teachers and pupils in the flora of their own respective districts. Teachers conducting school gardens are asked to include in each garden a forestry plot or bed for the propagation of native species from seeds

TREES IN PROVINCIAL NURSERY READY FOR DISTRIBUTION TO SCHOOLS

CHOICE EVERGREENS IN THE PROVINCIAL NURSERY and cuttings. During the past year some schools have done excellent work along this line. In this way it is hoped that the schools of the province will soon take on not only a much improved appearance, but also a truly national character, both as to teaching and general external setting.

We also advocate that cities and municipalities having several schools to provide for should establish small nurseries for the supplying of suitable trees, shrubs and perennial flowers in quantity. Such a school nursery in a city or rural municipality might be directly connected with one of the larger schools. In this way the pupils of such central school would be able to do at least part of the work and would have no small advantage from an educational standpoint as a result of this. Already a move has been made along this line in connection with one of the schools in Vancouver City, and also in one of the schools in the municipality of South Vancouver.

Most of the provinces in Canada have adopted the policy of supplying free to schools many of the text-books used by the pupils. It is our intention in British Columbia also to supply in a similar manner that which will make school life more pleasant and less monotonous—good playgrounds, carefully planned, well equipped and liberally furnished with our best Canadian trees and flowering shrubs. Our provincial schools nursery helps to make this possible.



SCHOOL GREENHOUSE, GEORGE JAY PUBLIC SCHOOL, VICTORIA, B.C.
In addition to starting early plants for their own school garden, the boys and girls of this school start thousands of plants from seeds and cuttings which are sold to the School Board for the purpos of sup. lying other school grounds and gardens in Victoria.

It should be stated here that the first three centres are those selling under one business manager, while the two last in the table work independently. The advantages of the larger organization, in Mr. Smith's estimation, are that the cost of marketing becomes less through the larger number of eggs and the larger amount of the products marketed. Funds are also provided by means of which cash is paid to the member when eggs or other products are delivered. This makes possible more careful selection than is possible when farm products are delivered one week and not paid for until the next.

The experience of Mr. Smith in his co-operative efforts has proved the need for educational work along the lines of production and marketing in a strictly business manner and that to secure the highest prices only produce grading number one should be offered for sale.

ONTARIO

SCHOOL FOR RURAL LEADERSHIP

FOR the last three summers the Ontario Agricultural College has held a summer school for rural leadership. The first two sessions were full of helpful suggestions and aroused much enthusiasm. The number in attendance, however, was not what it should have been. This year the condition of affairs has been changed. The attendance trebled and there were 120 who registered and attended the sessions of the school from July 23rd to August 4th; 80 of them were clergymen and the remainder clergymen's wives, school teachers, women's institute officers, etc. The work taken up included a course of 10 lectures on the Rural School. Mr. H. W. Foght, Specialist in Rural School Practice, Bureau of Education, Washington, D.C., was the lecturer. He took up and dealt with the school from the standpoint of curriculum, teacher, equipment, administration, etc. While his lectures led up to and ended with a strong case for consolidation of schools, he dealt in a splendid way with the possibilities of the little one-roomed school under proper direction, with a "Brown Mouse" teacher and a community building viewpoint. These lectures were attended by 280 rural school teachers, as well as the clergymen, etc., and from the enthusiastic reception Mr. Foght's lectures received we feel sure that much good will result. The following are the subjects of Mr. Foght's lectures:

1. The rural problem analyzed in relation to its educational, social and religious elements.
2. Institutional means for remaking rural life.
3. The farmer's wife, a vital factor in the problem.
4. The teacher and community leadership
5. The complete rural community school (illustrated)
6. Good roads and education (illustrated).
7. What every teacher can do for this advancement of vocational education (illustrated).
8. The meaning of modern sanitation in school and home.
9. The teacher and the play-life of the school (illustrated).
10 The revitalized course of study for rural schools.

A second course given was "Community Leadership" by A. Maclaren, B.S.A., Lecturer in Rural Sociology, Ontario Agricultural College, Guelph. The subject was dealt with from the following viewpoints,—the goal in rural life; rural mindedness—discovery, enlistment and training of leaders; methods of training; Canadian standard efficiency tests; boys' and girls' camps; problems in rural life; avenues of service demanding leadership, etc. These lectures were accompanied by practical demonstrations in three or four ways. An athletic meet was run off on a new standardized basis, in which 303 out of 330 eligible competitors competed. Miss Jean Austen directed a children's open-air play, "Bird Guardians," with the object of illustrating its possibilities in training children in self expression. A group of students and members of the college staff presented Dickens' "Cricket on the Hearth" as a suggestion for the use of drama in developing leadership, and lastly, a group of rural school teachers presented the pageant "The Call of the Country". This last event summed up in a very striking, impressive way the call for leadership, and the answer to it.

Besides these special events group and team games were organized between lectures, from 4 to 6 p.m. and in the evenings, for the purpose of encouraging the playing of games in rural districts as a means of developing latent possibilities.

This second course was followed by a series of seminar periods during which a lively discussion was entered into regarding "the message and mission of the country church": "methods of conveying the message and mission"; church organizations and their functions, church finances, business administration.

In the afternoons lectures were given covering the technical side of agriculture, including vegetable gardening, home grounds decoration, dairying, poultry, field husbandry, co-operation, marketing. The ladies had special sessions in cheese making, butter-making, women's institute work, medical inspection of school children, etc.

As a result of the summer school there was organized the "Ontario Rural Community Life Movement". The purpose of this organization is to promote the highest ideals of rural community life, religious, social, educational, physical and economic. It has quite a large programme in view, but two of the outstanding things for this year are the promotion of four district community life conferences, 2½ days' duration each, covering old Ontario; then we intend approaching the educational boards of the various theological colleges to try to have a more thorough course given in rural life interests, economic, social, etc., so that theological students may be more thoroughly prepared for the problems they will meet when they take a position in a country church.

MANITOBA

SHORT COURSE FOR RURAL MINISTERS

BY R. W. MURCHIE

FORTY-FOUR ministers and sixteen ministers' wives registered for the third annual short course in agriculture and rural sociology held at the Manitoba Agricultural College from Monday, July 30th, to Saturday, August 11th. The fact that eight of the sixty students have been in attendance at all three courses, and that twenty-four have returned for a second course, is proof of the helpfulness and popularity of the school. Three new departures were made this year—by the arranging of a systematic course extending over three years, and by the provision of separate classes for women in the afternoon, and options for men.

The whole class attended the morning lectures, when Principal B. J. Hales, B.A., of Brandon, gave a series of addresses on "The Rural School." Beginning with a short history of education, Principal Hales led up to the ideal education, defining the aims of the educational authorities of Manitoba. These lectures provoked lively discussions, and will no doubt stimulate a sympathetic interest in educational affairs amongst the rural ministers. Principal Hales was eminently fitted to conduct this course, for the progress which is being made in rural education in Manitoba is due largely to his enthusiasm, experience, and breadth of vision.

Four lectures on extension work were given by Mr. S T. Newton, Superintendent of Agricultural Extension in Manitoba. Mr. Newton explained the provisions of THE AGRICULTURAL INSTRUCTION ACT, and showed how these were being carried out in Manitoba, especially referring to the boys' and girls' clubs, which now have a membership of 16,000, and to the short courses in agriculture and home economics which have been so successful in rural centres in Manitoba.

A GROUP OF THE STUDENTS ENROLLED IN MINISTERS' SHORT COURSE, MANITOBA AGRICULTURAL COLLEGE, 1917

Mr. R. W. Murchie, of the College staff, gave a course of lectures on "Rural Recreation," tracing the history of the play movement, and giving practical demonstrations in team games and organized play.

One hour each forenoon was given up to gardening, when Professor F. W. Brodrick, B.S.A., lectured in an interesting and instructive manner on soil cultivation, seeds, varieties and storage.

In the forenoon Professor E. M. Eadie, of the Household Science Department, gave a course in home nursing to the ladies, and two demonstrations in home nursing were also given.

The men's class was divided in the forenoon, a few taking the poultry husbandry option under Professor M. C. Herner, B.S.A., while the majority elected to take the course in gas engines and automobiles with Professor Lawson Shanks, B.S.A. Many of the clergymen in Manitoba are finding it convenient to use the automobile for pastoral work, and all are alive to the importance of gas tractors and gas engines in the field and in the farm home. Professor Shanks gave a very thorough course and, having at his disposal the whole afternoon, he was able to include a goodly amount of practical work, beginning with the one-cylinder stationary engine and leading up to the more complicated mechanism of the automobile. It was a tired and greasy class by five o'clock. One of the students explained the popularity of the class by remarking: "We got our knowledge of horses in the school of experience; we want our education in automobiles in a cheaper school."

A large number of special lectures were provided in the evenings to which not only the students of the College, but also the public, were invited. Mr. J. W. Dafoe, Editor of the *Manitoba Free Press*, spoke ably on "Present-Day Problems." The Hon. Dr. Thornton, Minister of Education for the province of Manitoba, described the forward movement in education in Manitoba, illustrating his points by the description of actual happenings in Manitoba. Dr. Michael Clark, M.P., of Red Deer, addressed a large and enthusiastic audience on the subject of "Agriculture and Economic Problems." Mr. R. L. Richardson, Editor of the *Winnipeg Tribune*, gave an interesting talk on "Citizenship." Other lecturers were: President J. B. Reynolds, who spoke on "Rural Values", the Rev. Dr. R. C. Johnstone, Librarian, Winnipeg Public Library, and Professor V. W. Jackson, of the Manitoba Agricultural College, who gave an illustrated lecture on "Birds."

RURAL MINISTERS AND TEACHERS STUDYING THE MECHANISM OF GAS ENGINES

PREACHERS AT PLAY, UNDER THE DIRECTION OF MR. R. W. MURCHIE

PART IV

Special Contributions, Reports of Agricultural Organizations, Notes and Publications

ASSOCIATIONS AND SOCIETIES

THE WESTERN CANADA IRRIGATION ASSOCIATION

BY ROBERT J. C. STEAD, ACTING SECRETARY

THE eleventh annual convention of the above association was, this year, held at Maple Creek, Sask. This is the first time that the convention has been held in Saskatchewan, and it was particularly appropriate that the deliberations should be presided over by Hon. W. R. Motherwell, Minister of Agriculture for the province, who made a strong appeal for greater production.

Maple Creek is the centre of Saskatchewan's irrigation enterprises, which are on a much larger scale than most people, even residents of that province, appreciate. A large number of streams flow down from the Cypress Hills, and back in the '90's the ranchers began diverting the water from these streams for hay and pasture purposes. It is recorded that the first ditches at Maple Creek were dug in 1896, although the first irrigation license was not issued until 1900. About the same time irrigation began to be employed at Bear Creek and Piapot Creek. From these beginnings an irrigation district with 190 schemes has been developed. The irrigation is employed mainly for pasture and for growing crops of hay and other fodder. Irrigation and dry farming are practised side by side and the crop marketed at Maple Creek in 1916 had a valuation of $2,500,000.

The programme included the names of Prof. J. Bracken, of the Field Husbandry Department, University of Saskatchewan; Don. H. Bark, Chief of Irrigation Investigation Division of the Canadian Pacific Railway; Prof. W. H. Fairfield, Superintendent, Dominion Experimental Station, Lethbridge; F. H. Auld, Deputy Minister of Agriculture for Saskatchewan; F. M. Logan, Assistant Dairy Commissioner, Regina; James Johnson of Nelson, B.C.; Prof. L. S. Klinck, Dean of the Faculty of Agriculture of the University of British Columbia; G. R. Marnoch, President of the Lethbridge Board of Trade; A. S. Dawson, Chief Engineer of the Canadian Pacific Railway, Department of Natural Resources; Archibald Mitchell of the Mitchell Nursery Company; A. A. Dowell, Animal Husbandry Instructor of the University of Alberta; F. B. Linfield, Director Montana Agricultural Experiment Station at Bozeman, Montana, and others. The first three named—Messrs. Bracken, Bark and Fairfield,—devoted themselves entirely to a discussion of alfalfa raising, Mr. Bracken dealing with alfalfa under dry land conditions and Messrs. Bark and Fairfield discussing it under irrigation conditions. Alfalfa is essentially an irrigated crop, which is best illustrated by Prof. Fairfield's remark that the Lethbridge irrigation district is now the principal alfalfa centre of Canada, with about 15,000 acres devoted to this crop. It was grown originally for export, but has become the basis of an important live stock and dairy industry. The feasibility of increasing the fish supply of the country by employing irrigation reservoirs for that purpose was discussed in a very interesting paper by Prof. E. E. Prince, Dominion Fisheries Commissioner of Ottawa.

An invitation was received from the Nelson Board of Trade to make that city the next convention centre, and this invitation was supported by Mayor Annable of Nelson. As it is the practice of the association to meet year about on opposite sides of the Rockies, the invitation was accepted. The election of officers resulted as follows: Hon. President, the Hon. Minister of the Interior, Dr. Roche, Ottawa; First Hon. Vice-President, the Hon. Minister of Agriculture Duncan Marshall, Edmonton; Second Hon. Vice-President, the Hon. Minister of Agriculture, Mr. Motherwell, Regina; First Vice-President, Hon. Hewitt Bostock, Ducks, B.C.; Second Vice-President, G.

R. Marnoch, President of the Board of Trade, Lethbridge.

Executive Committee: R. G. Williamson, Maple Creek, Sask.; Jas. L. Brown, Kamloops, B.C.; Jas. Johnstone, Nelson, B.C.; F. H. Peters, Calgary; A. S. Dawson, Calgary; W. E. Scott, Victoria, B.C.; F. H. Auld, Regina, Sask.; F. E. R. Wollaston, Vernon, B.C.; Robert J. C. Stead, of Calgary was elected acting-secretary.

THE THIRTEENTH ANNUAL MEETING OF THE CANADIAN SEED GROWERS' ASSOCIATION

BY L. H. NEWMAN, B.S.A., SECRETARY-TREASURER

THE thirteenth annual meeting of the Canadian Seed Growers' Association was held in the offices of the Dominion Seed Commissioner, Ottawa, on Tuesday, July 31st, and continued on Wednesday, August 1st, at the Central Experimental Farm. The reports of the directors and the secretary for the year ending March 31st, 1917, having been well considered, were adopted unanimously.

THE DIRECTORS' REPORT

The report of the directors, after referring to the disturbed condition of the universe and to the unfavourable results of crop production in 1916, which had brought a flood of enquiries and an extra demand for good seed, dealt with the prospects of increased settlement after the war, pointing out the accession of responsibility that would accrue to see that all arable land available in Canada be made the most of. The directors deplored the fact that vast areas in Western Canada were at present given over largely to weeds.

In seeking a plan of action for the future the directors reviewed the conditions that existed as regards registered and improved seed in the period extending from 1910 to 1915. During that period it was found that there had been a steady and substantial increase in the acreage devoted to the production of registered seed. In 1910, 236 acres were devoted to the production of registered and improved seed, yielding 4,576 bushels of cleaned seed. In 1915, 3,533.4 acres were occupied in the production of this class of seed. This acreage produced 85,453 bushels of cleaned marketable seed. In 1910, 2,250 bushels of registered seed and 1,291 bushels of improved seed were offered for sale, while in 1915, 27,045 bushels of registered seed and 51,259 bushels of improved seed were offered.

The following table gives in detail the acreage and production during the years under consideration as well as those for 1916:

ACREAGE AND YIELDS OF REGISTERED AND IMPROVED SEED

	Acreage sale	Bushels produced	Reg. Seed offered for sale	Imp. Seed offered for sale	Total Seed offered for sale
1910	236	4,576	2,250	1,291	3,541
1911	785	17,211	10,000	6,531	16,631
1912	1,421	33,474	10,017	6,356	16,373
1913	2,149	67,771	23,139	42,869	66,008
1914	3,113	70,303	17,533	23,430	40,963
1915	3,533.4	85,453	27,045	51,259	78,304
1916	4,405.5	66.355	35,623	25,945	61,568

It was pointed out that, encouraging as the foregoing figures are, they do not adequately represent the ever-increasing extent of the work the Association is carrying on. Over fifteen hundred farmers are now engaged in an endeavour to maintain a high standard of excellence in their field crops through the use of selected seed and to get their neighbours to do the same. Prizes were offered for registered seed at the provincial exhibitions in Quebec, Ontario, Manitoba and Saskatchewan. Conferences in connection with the exhibitions were held at most places and valuable papers read.

THE SECRETARY'S REPORT

The secretary's report which not only covered the year ending March 31st, 1917, but was brought up to the date of the meeting, July 31st, stated that 285 applications for membership had been received during the year as against 132 the previous year. It explained that the Seed Centre scheme was not meeting with quite the success that was anticipated in the beginning, although progress had been made. Farmers appeared to prefer to work independently. In some provinces, notably Alberta, the difficulty which had confronted the Provincial Department of Agriculture in inspecting the fields of individual growers who are located at distant points had resulted in special efforts being put forth to have these isolated growers encourage neighbours to join with them in forming seed centres where a considerable area could be devoted in a given district to the production of high-class seed, thus justifying the sending of an expert to examine and report on the fields. The policy of leaving the field inspection work entirely to the provinces had worked out fairly well.

THE YEAR'S INSPECTION WORK

Following is a summary of the work of inspection for the year 1916:

	Mar. Provs.	Que.	Ont.	Man.	Sask.	Alta. B.C.	All Provs.
Number of growers answering enquiry cards and stating that they wished to be visited.	42	57	72	20	93	41	325
Number visited by inspector...............	51	28	91	16	89	16	291
Number hand-selected seed plots operated in 1916	89	25	54	15	11	42	236
Number growers making selections.........	32	19	41	9	50	12	163
Average size of hand-selected plots in case of cereals (acres)...........................	.23	.45	.54	.36	.35	1.55	.58
Total areas devoted to hand-selected plots (acres)................................	16.03	11.27	29.05	5.42	39.06	65.07	165.90
Total areas devoted to multiplying fields (acres)................................	605	122	683 3	59.75	2010	535.75	4405.50
Total amount produced on multiplying fields (bus.)................................	15,850	4,040	9,405	6,255	19,689	11,111	66,350

The inspection of thrashed seed produced and offered for sale by members was performed by temporary inspectors employed directly by the Association. The inspectors with one or two exceptions were the same men as those engaged during the previous year.

The chief difficulty connected with the inspection of seed in sacks is that of expense. While it seems absolutely necessary to the success of the work that all registered seed should be examined and sealed in sacks by an expert, yet the expense of carrying this into effect appears high compared with the amount of seed actually inspected. Where seed centres exist this difficulty does not obtain. In some cases it has been possible to cut down expenses by having the seed inspected at its destination where it can be reached more conveniently. This practice is regarded as dangerous, although at present it seems the only solution to the difficulty.

The report proceeded to deal with the special work that is being done, stating that the number of men willing as members to take up the work was continually on the increase. It briefly reviewed the proceedings at the conference of growers held at Saskatoon, Sask., last fall and referred to the various meetings which had been attended.

POTATO CULTIVATION

In the discussion which followed the presentation of these reports the opinion was expressed that more systematic work should be done with potatoes. Dr. Zavitz referred to the excellent evidence now available to show the superiority of seed potatoes grown in the cool moist districts of New Ontario over potatoes grown further south. He believed that the Association, working in co-operation with the Provincial Department, had an excellent opportunity of creating a source of supply of high-class seed potatoes in the Northern District mentioned. The secretary pointed out that action toward this end had already been taken and he confidently expected to see the work advance rapidly in the future, especially since the Provincial Department has now arranged to promote the work more aggressively.

In view of the information now available re the behaviour of potatoes, the Association agreed that the best method for the average farmer to follow in the production of potatoes, either for seed purposes or for food, is to procure the very best stock of the best variety available in Northern Ontario and to adopt the system of continuous selection of superior hills as required by the regulations followed by members of the Association. The evidence available up to the present demonstrates without question the value of this system. It is expected, however, that in many cases farmers can to advantage bring in a fresh supply of northern grown seed every few years. This would depend very largely upon the location of the farmer and the attention paid to the choice of seed.

SMUT IN BARLEY

Mr. Nunnick, of the Conservation Commission, referred to the prevalence of loose smut in barley this year. In Canada this disease has not heretofore attracted any considerable attention, as a result of which it has not been the practice of farmers to treat their seed barley for smut. Dr. Zavitz and others reported that the formalin treatment for oats has been quite ineffective in the case of barley smut. The best method of handling the latter disease was to treat with hot water, submerging the barley for five minutes in water held at a temperature of 125_0 Fahrenheit.

Mr. Moe of the Experimental Farm reported the prevalence of the disease known as Helminthirporium which attacks the leaves of barley, producing an effect very similar to that caused by ordinary rust. For this disease no effective treatment has yet been discovered.

In the commercial handling of seed it was recommended that purchasers be urged to treat their seed in all cases. The treatment of seed prior to selling is not practicable, since the effectiveness of the treatment diminishes rather quickly where seed is not sown at once. The use of new clean sacks for seed grain was also highly recommended.

Systems of cultivation to prevent the spread of certain weeds were discussed at some length, it being pointed out that most weeds could be overcome quite easily by the adoption of the proper methods of rotation and thorough cultivation.

AT THE CENTRAL EXPERIMENTAL FARM

At the Experimental Farm a careful examination was made of the various crops under test, a special study being made of the breeding work. Some very promising crosses made by Dr. Saunders and his assistants created a great deal of interest. A feature of this work which proved of special interest was the extent to which certain varieties were producing variations. The occurrence of these aberrent types goes to prove the value of the system of continuous selection and roguing adopted by the Association.

OFFICERS AND DIRECTORS

The following officers and directors were elected, ten of the directors being chosen by the association and one by each of the nine provinces:

President, Dr. James W. Robertson, C.M.G., LL.D., Ottawa.

Vice-Presidents, Prof. C. A. Zavitz, Guelph; Prof. M. Cumming, Truro, N.S.; Prof. James Murray, Macdonald College, Que.

Secretary and treasurer, L. H. Newman, B.S.A., Ottawa.

Executive Council, Dr. James W. Robertson, L. H. Newman, Prof. C. A. Zavitz, Prof. T. J. Harrison, Agricultural College, Winnipeg; Prof. James Murray; R. S. Duncan, Department of Agriculture, Toronto; E. N. Savoie, Department of Agriculture, Quebec, Que.

Directors, G. H. Hadwin, Duncan, B.C.; Prof. John Bracken, Agricultural College, Saskatoon, Sask.; R. S. Duncan, Department of Agriculture, Toronto, Ont.; M. P. Tullis, Department of Agriculture, Saskatchewan; H. A. Craig, Deputy Minister of Agriculture, Edmonton, Alta.; Prof. M. Cumming, Agricultural College, Truro, N.S.; Geo. Dow, Gilbert Plains, Man.; Prof. T. J. Harrison, Agricultural College, Winnipeg; Dr. R. B. Hagerman, East Florenceville, N.B.; E. A. Howes, Edmonton; Prof. James Murray, Macdonald College, Que.; Prof. L. S. Klinck, Vancouver, B.C.; W. L. MacFarlane, Fox Harbor, N.S.; William H. McGregor, Miscouche, P.E.I.; William Palmer, Scotch Lake, N.B.; F. N. Savoie, Department of Agriculture, Quebec, Que.; W. W. Thompson, Department of Agriculture, Regina, Sask.; Dr. C. A. Zavitz, Guelph, Ont.

DEMONSTRATION IN CANNING AND DRYING FRUITS AND VEGETABLES

The Ottawa Horticultural Society in co-operation with the Women's Auxiliary of the Ontario Resources Committee, on August 15th, 16th and 17th, held a demonstration in Ottawa in the canning and drying of fruits and vegetables. The demonstration was in charge of Mr. F. E. Buck, President of the Ottawa Horticultural Society. The opening session of the three-day demonstration was opened by the Dominion Food Controller, Hon. W. J. Hanna, who expressed the hope that in a very short time such meetings would be under way in all parts of the Dominion.

The demonstrations covered the drying and canning of such crops as beans, carrots, beets, tomatoes, cauliflower, corn and various kinds of fruit. One session was devoted to a discussion on the storing of vegetables in cellars and pits. The demonstration was given by Miss Laura Kirby, of the Central Experimental Farm staff. Mrs. J. Muldrew, formerly Superintendent of the Women's Institutes in Alberta and now a member of the staff of the Food Controller, and other officials made strong appeals for economy in the use of foods.

THE BRITISH EMPIRE AGRICULTURAL RELIEF OF THE ALLIES FUND

Recovery after the war is a matter that is seriously engaging widespread attention, especially as regards the countries that have been devastated by German ruthlessness. In Belgium, in Northern France, in Serbia, in sections of Russia and in a large part of Roumania, the country has been laid waste and farmers have lost their all. To aid these people to restoration an organization has been formed with headquarters in England and with branches in different parts of the Empire, under the title of The British Empire Agricultural Relief of the Allies Fund. The object is to endeavour to get the agricultural communities in the countries not immediately in the whirl of belligerency to assist those that are. For this purpose a strong branch has been formed in Canada with His Excellency the Governor-General as patron, Rt. Hon. Sir Robert Borden and Rt. Hon. Sir Wilfrid Laurier, as honorary presidents, Hon. Martin Burrell, Hon. Sydney Fisher, Sir Henry Drayton, Mr. C. A. Magrath and the chiefs of the various branches of the Dominion Department of Agriculture as members of the executive committee, and Dr. Jas. W. Robertson as chairman, Mr. A. G. Parker, Hon. Treasurer, and Messrs. J. B. Spencer and C. E. Mortureux, honorary secretaries. Provincial committees have also been organized with the several lieutenant-governors as patrons and the Ministers of Agriculture as honorary presidents.

At a meeting of the central executive, held at the offices, Bank Street Chambers, Ottawa, on August 15th, a committee consisting of the chairman and Messrs. J. A. Ruddick, Dairy Commissioner, and C. E. Mortureux, official translator, was appointed to decide upon the best method of reaching the dairy farmers of the country. It was announced that an appeal to patrons of cheese factories and creameries had been prepared. Mr. Mortureux undertook to address the Catholic clergy of the province of Quebec in the interests of the movement.

NEW PUBLICATIONS

THE DOMINION DEPARTMENT OF AGRICULTURE

THE DOMINION EXPERIMENTAL FARMS

THE DIVISION OF BOTANY

The Black or Stem Rust of Wheat; a popular account of the nature, cause and prevention of grain rust; Bulletin No. 33, second series. The object of this 16-page bulletin is well expressed in the first few lines of the introduction. It has been prepared, partly to amplify the illustrated coloured poster on the same subject recently issued by the Department, and partly to meet the many inquiries received by the Division, relating to the nature and cause of grain rust, about which there exist among farmers and others not always correct theories.

THE DAIRY AND COLD STORAGE BRANCH

Buttermaking on the Farm, by Geo. H. Barr, Chief of the Dairy Division; Bulletin No. 53, Dairy and Cold Storage Commissioner's Series, with an introduction by Mr. J. A. Ruddick, Dairy and Cold Storage Commissioner. This bulletin of 16 pages is a revision of Bulletin No. 17, which is practically out of print, with some additions. It is a veritable text book on buttermaking, giving advice in plain terms on every item of the process with illustrations of utensils and plans of dairies.

THE PROVINCIAL DEPARTMENTS OF AGRICULTURE

NEW BRUNSWICK

The Annual Report of the Director of the Elementary Agricultural Education Division of the Department of Agriculture of New Brunswick for the Year Ending October 31st, 1916, makes a pamphlet of 26 pages. It contains complete accounts of the operations of the year and shows that considerable progress has been made in all departments, the number of pupils receiving instruction in Nature Study and Elementary Agriculture with school gardening having increased by over 1,000 compared with previous years.

ONTARIO

The Preservation of Food—Home Canning, compiled by Miss Ethel M. Chapman; Bulletin No. 252, Women's Institute series. In this 32-page bulletin, Miss Chapman not only tells about canning and preserving all kinds of fruit and vegetables and several kinds of meats, but she treats of the preservation of eggs, the drying of fruit and the curing of pork and beef. A chapter on "Storing Vegetables for Winter Use," by Mr. S. E. Johnston, is added.

Ontario Agricultural College and Experimental Farm, 1916. The forty-second annual report, a blue book of 72 pages, gives interesting accounts of the activities of last year, of the research that has been carried on and of the experiments that were in progress or completed. The report also contains lists of graduates and students. Among other statements is that 444 students had enlisted up to the end of the year, of whom 38 had been killed, or had died of wounds.

Pruning, by F. M. Clement, B.S.A., and F. S. Reeves, B.S.A. We have here a most instructive bulletin, numbered 248 of the Fruit Branch of the Provincial Department of Agriculture, containing 36 pages and including 78 well-defined illustrations. It gives advice and counsel relative to the pruning of practically every fruit tree known to the province, large or small.

The Pear in Ontario, by F. M. Clement, B.S.A., and O. J. Robb, B.S.A. With numerous illustrations, this bulletin, which is No. 249 of the Fruit Branch of the Provincial Department of Agriculture, deals with the cultivation of the pear from inception to maturity and on to the marketing. It advises as to the varieties best suited to Ontario, tells of the profit that can be made and supplies information regarding the combating of insect and disease.

Insects Affecting Vegetables, by C. J. S. Bethune, Professor of Entomology; Bulletin No. 251, Ontario Agricultural College. In this 32-page bulletin full descriptions, with illustrations, are given of the many kinds of insect pests to which vegetables are subject. The best treatment for their suppression si also prescribed in detail.

Ontario Veterinary College Calendar, 1917-18. Term commences October 1st, 1917, and closes May 1st, 1918. Full particulars of the studies, the fees and the honours to be gained are given in the calendar.

COOKING AND CANNING

A number of bulletins on Cooking and Canning for free circulation have been issued by the colleges and Departments of Agriculture. Among them might be mentioned:

Canada—Can for Victory; published by the Food Controller.

Ontario—Home Canning of Fruits and Vegetables, by E. L. Davies, Demonstrator in Bacteriology, Ontario Agricultural College.

Macdonald College, Quebec—Home Canning of Fruits and Vegetables, by Miss K. A. Fisher, B.A., School of Household Science.

School Fair Cookery, Bread and Cake, prepared by School of Household Science.

Saskatchewan—The Value of the Kitchen Garden, by Miss Abbie DeLury, Director of Homemakers' Clubs.

Preservation of Food, by Miss Abbie DeLury.

New Brunswick—Modern Methods of Canning, by Miss Ada B. Saunders, Household Science Demonstrator.

Prince Edward Island—The Home Canning of Fruits and Vegetables, by Miss Hazel L. Sterns, Supervisor of Women's Institutes.

Nova Scotia—The Cooking and Canning of Vegetables, by Miss Jennie A. Fraser, Superintendent of Women's Institutes, and P. J. Shaw, Professor of Horticulture.

NOTES

Mr. William Dawson, B.S.A., who, since the inception of THE AGRICULTURAL GAZETTE, had been the Assistant Editor, has resigned to accept a position on the staff of the Moving Picture Bureau of the Ontario Government.

Mr. J. R. Spry, B.S.A., who had been in charge of the drainage work of the province, has been appointed Director of Industrial Farms for Ontario, in succession to Mr. S. E. Todd, who is now Assistant to the Food Controller of Canada.

On June 30th, 1917, according to the Census and Statistics Bureau, compared with the numbers on the same date in 1916, horses had increased in Canada by 44,629, milch cows by 34,364, other cattle by 11,494 and sheep by 44,616. Swine had decreased by 301,146. Since 1912 horses have increased by 342,897 and milch cows by 38,221. Other cattle have decreased by 502,360, sheep by 72,664 and swine by 963,784.

On account of the rapid development of Agricultural Extension work and for the convenience of those who desire to transact business with the Extension Service officials, the Extension office has been moved from the Manitoba Agricultural College to the new Parliament Buildings in Winnipeg. The work will continue to be under the direction of Prof. S. T. Newton, the Superintendent of the Service.

Although the quantity of butter exported from Australia for the year 1916-17 has been exceeded on several occasions, notably in 1911, the cash returns received show that the past season was the most profitable in the record of the butter industry. At the end of April, 1917, the value of the butter sent aboard was $25,025,321, as compared with $22,538,619 in 1911. In spite of the scarcity in freight there were 69,053,260 pounds of butter exported in 1916-17 at an average of 36¼c. per pound.

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Aug. 11—Buttermilk Low in Protein—Good Food for Hogs and Poultry, H. H. Dean, page 1009.

Aug. 25—The Show a Sales Ring for Cattle Breeders, E. S. Archibald, page 1064. Fitting and Preparing Sheep for the Show Ring, T. Reg. Arkell, page 1069.

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Sweet Clover—The Truth, M. O. Malte, Ph.D., page 556.

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The Last Word in Canning—How the Housewife may do her Share in the Conservation of Food, page 589.

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"Catching Them Young"—What is being done to Teach the Young Idea Poultry Raising, page 325.

The Farmer's Magazine, Toronto, Ont., August, 1917.

O. A. C. No. 104 Winter Wheat, by Editor, page 7.

The Canadian Thresherman and Farmer, Winnipeg, Man., July, 1917.

Conserving the Surplus, page 5.

PART V

The International Institute of Agriculture

T. K. Doherty, LL.B., Commissioner

FOREIGN AGRICULTURAL INTELLIGENCE

All communications in regard to this section of THE GAZETTE should be addressed to T. K. Doherty, Institute Commissioner, Department of Agriculture, Ottawa.

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SCIENCE AND PRACTICE OF AGRICULTURE

GENERAL INFORMATION

1—**International Yearbook of Agricultural Legislation.**—*International Institute of Agriculture,* Rome, 1916.

The International Institute of Agriculture has published the fifth volume of the *Yearbook of Agricultural Legislation,* which contains the laws relating to agriculture published in the different countries of the world. The *Yearbook* is divided into: Legislation regarding statistics—Commercial legislation—Financial and Customs legislation—Laws concerning animal products—Laws regarding agricultural organisation—Laws concerning diseases and animal pests of plants—Legislation for cooperation, insurance and credit—Laws concerning real-estate—Legislation regarding relations between capital and labour in agriculture—Legislation concerning rural hygiene and rural police.

Some brief indications of the most important laws published in the technical parts of the *Yearbook* may be given.

Chapter I of Part IV relates to laws for crops during the war and gives the whole text of the decrees of the German Empire of March 31, 1915, and September 9, 1915, with the object of providing for sowing down crops during the war. The Austrian Empire published, on March 3, 1915, a decree to provide for the reclaiming of uncultivated land during the war, and on May 6, 1915, another decree providing for the utilisation of all the ground which is suitable for use as pasture.—France, by a decree of September 7, 1915, proposed to develop agricultural production during the war, by supporting the use of agricultural machinery by means of grants to aid purchase.—Greece, by a law dated October 28, 1915, has decided the rules to be followed for agricultural progress, in spite of the special conditions owing to present circumstances. Italy, by a decree of June 3, 1915, has taken steps to assure the quick and steady execution of work related to the crops, and by another decree of June 6, 1915, has authorized the Minister of Agriculture to buy agricultural motors and machinery and to give premiums to those associations which, by means of the implements they possess, undertake the methodical execution of agricultural work of general utility.

Chapter II of Part IV contains the measures taken to provide for the normal development of crops in general. It contains a law of the Argentine Republic of

June 8, 1915, which obliges the Executive Committee of the Corn Exchange to buy seed for distribution to agriculturists unable to do so, and two laws of Manitoba (Canada) of March 10, 1915, with the object of providing seed for such agriculturists as are unable to obtain it directly.—In the chapter on forests, the *Yearbook* publishes the laws of the Grand-Duchy of Baden, China, New Hampshire (U.S.A.), Regency of Tunis, Greece and Uruguay, which deal with the administration of the forests, reafforestation, forests police, etc. The Chinese law of November 3, 1914, which organises forest administration throughout China and gives measures for reafforestation, is of special interest.

Part V of the *Yearbook*, devoted to animal production and products, shows the legislative activities of the various countries to assist animal production and products. This activity is shown under: Measures for developing and improving breeding.—Diseases of animals.—Hunting and fisheries.—Beekeeping and silkworm raising.—The English law of July 29, 1915, which has for object the maintenance of a certain number of livestock for the duration of the war, and for 12 months after the cessation of hostilities, deserves special attention. To attain this object, the law, which applies to Ireland, Scotland, Wales as well as England, authorizes the Departments of Agriculture to prohibit or limit the slaughter of livestock, to prohibit or limit the sale of the meat of animals under a certain age, to give powers to local authorities to assure the administration of the law, etc. The Spanish law of December 18, 1914, and the regulation of June 4, 1915, regarding preventive measures and the control of diseases of animals are also important. The law and the regulation are divided into two categories: the first regulates the internal organisation of the Department for the control of diseases of animals and states the guiding principles to be followed for control; the second includes measures regulating the import and export of animals.

The measures taken in the various countries for regulating agricultural organisation and education are grouped together in Part VI of the *Yearbook*. The first class includes an ample set of legislative measures. It includes measures taken in order: to create state organisations for the guidance of agricultural production, or to modify existing institutions for that purpose; to found purely advisory bodies; to found public organs of local character in order to direct the activity of agriculturists according to modern technical principles from a practical point of view. A group of Brazilian decrees is also noted, of which, one of January 13, 1915, defines the functions of the Secretary of State for Agriculture, another of January 27, 1915, creates the Department of Animal Husbandry and regulates its activities, while a third of April 6, 1915, regulates the functions of the Department of practical agriculture and a fourth, of Jan. 27, 1915, controls the working of the federated zootechnical Stations.

Part VII contains the regulations issued in 1915 for the control of plant diseases, weeds, and animals injurious to plantations to control pests that have already appeared, and to help agriculturists having suffered from the pests. Many of these regulations are in relation to the control and destruction of locusts; the most important laws are those of: Columbian Republic, November 15, 1915.—Costa Rica, June 3, 1915.—Philippine Islands, February 5, 1915.—Madagascar, October 5, 1915.—Guatemala June 5, 1915. Among other decrees given in this part of the *Yearbook* may be mentioned the French decree of February 5, 1916, extending the duties of the Department of Phytopathological Inspection, created by decree of May 1, 1911, modified under date of January 16, 1913, and which devotes this Department, at first limited to horticulture, to agricultural production in general.—A law of British Columbia (Canada), of March 6, 1915, contains regulations for the control of weeds, and a decree of Uruguay of January 16, 1915, regulates the carriage of plants in order to prevent the spread of plant diseases.

2—**Agriculture in Guatemala**—LEMUS MANUEL, in *Centro America, Organo de Publicidad de la Oficina Internacional Centro-Americana*, Vol. VIII, No. 3, pp. 322-340. Guatemala, July-September, 1916. (5 pp. in Institute Bulletin).

3—**The First Agricultural Demonstration Trains in Russia.**—BENZINE V., in *Agriculture and Forestry*, Vol. CCLI, Year LXXVI, May, June and August, pp. 10-30; 161-179; 506-521. Petrograd, 1916.

In Russia, the first agricultural demonstration train was established on the Vladikavkaz railway, which belongs to a private company. The idea of such a movable agricultural museum and lecture room was suggested to the Railway Company in 1908 by the Don-Kouban-Tersk Agricultural Society. The Company, which had previously tried to encourage the development of some branch of agriculture among the numerous railway men, wrote in 1912 in a report of the general Direction that 40 percent. of the total goods carried by the railway system consisted of agricultural products, principally cereals and that it was to the interest of the railway company to cooperate in the agricultural development of the region; it indicated, as a means to be used, the creation of experiment plots at the railway stations, which should act, according to the needs of the locality as active centres of agricultural propaganda. Ten of these experimental fields were to be founded, and in addition, a silo was to be built at Beslau station in the maize region. This proposal was received favourably by the general Direction, and not long after, the Agricultural Department nominated agricultural experts to organise the work of the first three experimental fields, which were to be established the same year.

In addition the Railway Company exchanged ideas with the local Agricultural Societies and the Agricultural Department with good results, so that on September 26, 1913, the first agricultural train, made up of 11 carriages, could commence its itinerary on the Vladikavkaz Railway; it visited 48 stations in 48 days and about 60,000 people came to see it.

On account of the satisfactory result of this first trial, another train was organized in the spring of 1914 with the chief aim of selling the seeds of forage and kitchen-garden plants, insecticides, books on agriculture, etc.

The train was also utilized during the autumn. It then comprised 14 carriages: 1 for teaching material regarding field cultivation—1 for economic zoology—1 for fruit trees—1 for beekeeping—1 for poultry keeping—3 as platforms for agricultural machinery and implements—1 for the sale of books on agriculture—1 (second class) for the agricultural staff—1 (first class) for dining room—1 (fourth class) for the assistants—1 as platform for exhibiting diagrams, etc., and for lectures—1 cold storage car. The train was in commission for 66 days (Sept. 16—November 21); it stopped at 58 stations, and was visited by 41,586 persons, including: 12,601 agriculturists—18,506 women—20,464 scholars of both sexes accompanied by their teachers.

In the spring of 1916, the train was organized for the sale of seed, insecticides, etc., selling a total value of $105,000. The sale of seed gave such encouraging results that the Railway Company has decided to rent the necessary ground to produce the seeds of kitchen-garden plants, while the Agricultural Department will provide the seed. In consequence of such results, the Department has awarded a grant of $3,200 for the purchase of teaching material, and the Railway Company has commenced building a lecture car 66 ft. long, with a cinematograph, projection lantern, and to contain 200 persons. At present, the work of the train is carried on under a director who has three assistants and one agent for the sale of seed, etc., and who gets in touch with the local agricultural organisations to settle the propaganda work to be carried out in each district. The Author, who is now the director of the train, concludes his report thus:

1) Agricultural trains may become a powerful means for agricultural propaganda work, and contribute to the development of all kinds of farms, particularly snall farms.

2) The activity of this agricultural train ought to correspond to the real needs of local agriculture and should as far as possible be always based on the results of local agricultural experiment stations and local farms showing the most progress.

3) The work of the train should be intimately connected with that of the local agricultural societies and with that of the States.

4) Given that the state of agriculture has a great influence on the goods-traffic, and consequently on the Railway returns, the Railway Company should regularly provide the expenses for the agricultural trains as a means favouring a greater use of the railways crossing the agricultural regions of Russia.

5) Given that each railway traverses several regions and provinces, each having its own agricultural society, it is necessary, when establishing an agricultural train, to establish also an agricultural organisation capable of carrying out the work in all the regions traversed by the railway, and in cooperation with the local societies.

6) Given the national importance of the agricultural trains, it is to be desired that, if they are to be instituted on all the railways, a special law should be passed concerning them and treating them as an institution.

In 1914, following the example of the Vladikavkaz Railway, the Moskow-Kanzan Railway has instituted a special agricultural train, and the South East Railway organized in 1916 its first agricultural train for the sale of seed, etc.

4—**Volunteer Co-operators with the United States Department of Agriculture.**—*United States Department of Agriculture,* Weekly News Letter, Vol. III, No. 46, Washington, D.C., June 21, 1916.

Nearly 770,000 persons, largely successful farmers, are now aiding the department by furnishing information, demonstrating the local usefulness of new methods, testing out theories, experimenting and reporting on conditions in their districts—by helping in short in almost every conceivable way to increase the knowledge of the department and to place that knowledge at the service of the people. The army of volunteers receives no pay from the Government. It is estimated that at least one farm out of every twenty is working in some way with the department.

The great majority of the co-operators are men who farm for a living. A wide variety of other occupations, however, is represented. For instance, fifteen thousand railroad station agents have been instructed by railroad officials to furnish the Office of Markets and Rural Organization with postcard reports of shipments of perishable crops, which are used in the market news service of the office; four hundred cold-storage plants report monthly on their holdings of apples; millers, grain dealers, chambers of commerce, etc., furnish data in connection with the work of grain standardization. These are only a few instances out of many.

The demonstration work of thousands of farmers, members of farm bureaus, county associations and community clubs is of the utmost importance in the spread of sound agriculture. An instance may be mentioned, of a thousand farmers now taking part in demonstrations concerned with cultural methods for sugar beets. The farmers also actively assist the department in the conduct of experiments. Eleven thousand are growing the plants which the department introduces from foreign countries. Seed corn is being tested by a large number, and many orther experiments are being carried out.

CROPS AND CULTIVATION

5—**Weather Forecasting and Mountain Stations.**—FERGUSSON S. P., in *The University of Nevada Agricultural Experiment Station Reno, Bulletin* No. 83, pp. 4-30. Carson City, Nevada, 1915.

The writer discusses the advantages to be obtained, in regard to weather forecasting, from the comparative statistics furnished by stations situated at the foot and summits of mountains. Observations have been made at Mt. Rose (10,600 ft.) and at Fallon, situated 60 miles to the East of Mt. Rose in the Carson Luik Valley, at an altitude of 3,960 ft. The most important results are appended. They are also confirmed by those from other mountain stations.

1) On Mt. Rose, during the period 1911-1914, 32 cases of abnormal and rapid fall of temperature were observed; these were accompanied at the Fallon Station by: *a*) in 15 cases, an absolute fall simultaneous with the above; *b*) in 7 cases, a slight rise of temperature; *c*) in 10 cases, a corresponding fall in temperature, occurring not simultaneously but in the course of the following 48 hours.

The most conclusive results were obtained at Mt. Royal (800 ft.), Canada, where the thermometer was used in conjunction with that of the station in the plain, viz.: the observatory of the University of McGill.

a) When the temperature at the upper station remains invariably higher than that at the lower station, the weather tends to remain stable, or to become warm;

b) On the other hand, the occurrence of lower temperatures on the mountain tops is to be regarded as an indication of the early arrival of a cold wave in the plain (cf. case *c*, Mt Rose).

2) When the falls in temperature at foot and summit are simultaneous a cyclone or an anticyclone may be expected over the region concerned.

3) The movements of the atmosphere in general are strongly influenced by the features of the mountain relief between the highest and most isolated peaks. The data collected on the mountain top by no means correspond with those obtained at the same average level over the plain by means of kites and observation balloons.

4) The comparison of data obtained at the foot and summit of mountains has clearly demonstrated the value of this type of research in establishing the effect of topography on the behaviour of the weather. The local study of optical atmospheric phenomena and a knowledge of local topographical relationships as a function of the distribution of meteorological factors are of considerable value as a means of increasing the utility of daily weather bulletins and maps.

8—**The Washing out of the Nitrates from Arable Soil at Rothamsted.**—RUSSELL, E. J., and APPLEYARD, A., in *The Journal of the Board of Agriculture,* Vol. XXIII, No. 1, pp. 22-27, London, April, 1916. (2 pp. in Institute Bulletin).

The winter 1915-16 was much wetter than usual at Rothamsted, especially during December and February.

It is well known that, in washing through the soil, water carries with it a considerable amount of soluble material and produces two effects: (1) deflocculation of the clay; (2) washing out of the nitrates.

At Rothamsted the loss of nitrates was least on heavy land, greater on good land and on light land, and greatest on land that had been well manured the previous year and fallowed. The author gives a detailed account of the amount of rainfall and the loss of nitrates in the various plots.

The remedies suggested are: (1) the clay has to be flocculated once more, by applying to the soil, chalk, limestone, lime or soot. (2) the loss of nitrate has to be made good, by a dressing of quick acting nitrogenous manure. Soot serves for either purpose, a fact that the practical man has long since realized.

14—The Utilisation of Sewage-water in Italy.—AITA, A., in L'Italia agricola, Year 53, No. 11, pp. 499-502. Piacenza, November, 15, 1915. (2 pp. in Institute Bulletin).

18—**Seeds and Plants Introduced into the United States by the Bureau of Plant Industry of the Department of Agriculture during the Second Half of 1913.** —I. *U. S. Department of Agriculture, Bureau of Plant Industry, Inventory of Seeds and Plants Imported by the Office of Foreign Seed and Plant Introduction During the Period from July 1 to September 30, 1913,* No. 36, 74 pages + 6 Plates Washington, December 23, 1915.—II. *Idem. Inventory* No. 37 (Period from October 1 to December 31, 1913) 95 pp. 6 plates, Washington. March 25, 1916. (8 pp. in Institute Bulletin).

19—The Determination of Dry Matter in Beets and Other Roots.—CHRISTENSEN, R. K., Communication transmitted to the International Institute of Agriculture by its Danish correspondent, Baron Rosenkrantz. (3 pp. in Institute Bulletin).

In Denmark there are made each year a large number of determinations of the dry matter in different roots, by different methods of research, such as those made in agricultural laboratories which investigate cattle feeds—experiments undertaken by the state for the cultivation of plants—local field experiments undertaken by agricultural societies. Besides determinations of dry matter are made in the work of improving root seed, and of controlling the feeding of cattle. Finally, besides the State laboratories there is a considerable number of private ones. The methods employed are described in detail in the Institute Bulletin.

21—A Bacterial Test for Plant Food Accessories (Auximones).—BOTTOMLEY, W. B., in *Proceedings of the Royal Society* (*Biological Sciences*) Series B, Vol. 89, No. B 610. London, August 2, 1915.

The nutrition of a plant depends, not only on the supply of mineral food substances, but also upon the presence of certain accessory food substances, or auximones (=promoting growth), very small amounts of which are sufficient to satisfy the needs of the plant. Hitherto the only means of demonstrating the presence of auximones has been their action on the higher plants. Experiments showed that the auximones in bacterised peat produced an increase in soil nitrification. This suggested that liquid cultures of the nitrifying organisms might provide a test for plant auximones.

23—The Relation of Soil Moisture to Transpiration and Photosynthesis in Maize.—YUNCKER, T. G., in *Plant World,* Vol. 20, No. 6, pp. 151-161. Baltimore, Md., June, 1916.

Experiments to determine the relation between the amount of transpiration and of photosynthesis in corn plants and the degree of soil moisture in which they were grown. The soil moisture was kept at three degrees, viz., 25, 45 and 65 per cent of total saturation.

24—Germination Tests of the Seeds of Garden Cress (Lepidium sativum) under very varied Conditions.—LESAGE PIERRE, in *Comptes Rendus des Séances de l'Académie des Sciences,* 1916, Second Half-year, Vol. 163, No. 18, pp. 486-489. Paris, October, 30, 1916.

26—Studies on the Correlation of Characters in the Oat Plant, in U.S.A.—LOVE, H. H., and LEIGHTY, C. E., in *Cornell University Agricultural Experiment Station, Memoir No. 3,* pp. 1-70. Ithaca, N.Y., 1916. (7 pp. in Institute Bulletin).

28—Correlation between the External and Internal Morphology and the Length of the Vegetative Period of some Varieties of Trifolium pratense; Research-work in Russia.—JOLTKEVITCH, V., in *Review of Experimental Agricultural Science dedicated to the memory of* P. S. KOSSOVITCH. Vol. XVII, Part 3, pp. 239-248. Petrograd, 1916. (4 pp. in Institute Bulletin).

Researches carried out part at a farm in the province of Orel, part at the agricultural laboratory of the University of Kiev. The observations were made in 1912 and 1914.

29—Experimental Work in Egypt on Various Cereals.—I. DUDGEON, G. C., and BOLLAND, G., Work on Egyptian Wheats, in *Egyptian Ministry of Agriculture, Technical and Scientific Bulletin,* No. 7, 9 pp. Cairo, 1916.—II. HUGHES, F., Tests of Flour made from Egyptian Wheats, *Idem.,* No. 10, 12, pp. illus.—III. BOLLAND, B. G. C., Work on Great Millet (*Sorghum vulgare*) and Bersim. (*Trifolium alexandrinum*) (1), *Idem.,* No. 8, 8 pp.—IV. DUDGEON, G. C., and BOLLAND, B. G. C., Work on Egyptian Maize, *Idem.,* No. IX, 8 pp.

32—Commercial Varieties of Alfalfa in the United States.—OAKLEY, R. A., and WESTOVER, H. L., in *United States Department of Agriculture, Farmers' Bulletin* 757, 24 pp. Washington, October, 1916.

There are recognized in the United States nine distinct kinds of commercial alfalfa, differing in their adaptation to climatic conditions: the common alfalfa group, the Turkestan group, Grimm, Baltic, Canadian variegated, sand lucerne, Peruvian, Arabian and the yellow-flowered group.

The bulletin deals with each variety in

detail. Among the conclusions are the following: It is highly advisable that the farmer should learn to distinguish good from poor seed. Plump seed of an olive-green colour almost invariably germinates well, while shrivelled or brown seed generally germinates poorly. The presence of any appreciable quantity of weed seeds or other impurities indicates a poor quality of seed. Owing to the fact that alfalfa does not produce seed satisfactorily in the United States there is little use trying to grow it for seed in the Eastern States. Breeding work with alfalfa offers great possibilities, but the time and expense involved are so great that a farmer cannot afford to undertake it.

39—**Peanut Oil.**—THOMPSON, H. C., and BAILEY, H. S., in *United States Department of Agriculture, Farmers' Bulletin* 751, 16 pp. Washington, August 1916. (2 pages in Institute Bulletin).

The principal by-product of peanut-oil manufacture is the meal, which is a very valuable feed. Peanut meal has about the same fertilizer value as cottonseed meal, but its greatest value is for live stock feeding. The hulls may also be classed as a by-product. They can be ground with the meal to give bulk, but they do not add to the food value. They can also be used as fuel in the boilers of the oil mill, or as bedding for live stock.

40—**The Acclimatization of a Rapid Growing tannin Plant (Rumex Hymenosepalum) in France.**—PIEDALLU, A., in *Comptes Rendus de l'Académie des Sciences*, 1916, Vol. 163, No. 20, pp. 575-576. Paris, November, 1916.

41—**The Effect of Continued Capillary Watering.**—DANIEL LUCIEN, in *Comptes Rendus des Séances de l'Académie des Sciences*, 1916, Second Half-year, Vol. 163, No. 19, pp. 525-527. Paris, November 6, 1916.

The Author has studied, in his garden at Erquy (France), the effects of continued capillary watering compared with the intermittent watering employed in market-gardening. For this purpose vessels with a large surface were used filled with water in which were dipped strands of wool or cotton which acted as syphons. The water thus supplied to each plant was easily calculated as well as being easily reduced or increased by altering the number of threads. This method of watering had for advantages: economy of water—no burning of the leaves, even if carried on in open sunlight —freedom from washing out of nutritive substances from the soil—loosening of the surface maintained to the highest degree.

Three series of experiments were started: in the first, lettuce, chicory, and cabbage were left almost entirely without watering; in the second they received an abundant intermittent watering interrupted every 2 days; in the third they received capillary watering, which may be called continuous and in which the water was delivered at the foot of each plant by syphons of variable number.

The plants watered at too long intervals gave the worst results: the lettuce and chicory flowered. Those having intermittent watering, with larger amounts of water than those given by capillary watering, at first grew normally, but in the long run their leaves became red and hard or of an unequal green colour. Those plants having capillary watering always had turgescent leaves of a fine green colour and showing perfect health. None of the foot watered plants flowered, which also happened for a fair number of specimens in the second series, although in less number than in the first.

The same system was tried for germinating seeds and afterwards watering the seedlings. 300 lettuce seeds, 300 headed cabbage seeds, and 300 radish seeds were used. The seeds were sown under similar conditions, divided into three lots and watered as in the previous experiments. The results obtained were:

	Number germinated		
	1st lot almost without watering	2nd lot: intermittent watering	3rd lot continual watering
Batavia Lettuce....	30	61	97
Cabbage...........	57	68	82
Radishes...........	43	57	80

It was found that continual capillary watering also gave plants much in advance of those of the other lots.

Anatomical study of the leaves, stems and roots has shown the differences that usually exist between plants suffering from drought and those with a normal supply of water.

With guaiacum stain, differences in the colouring of the latex of chicory were shown: the rapidity of the reaction and the intensity of the colouring were in proportion to good utilisation of the water. As the diastatic ferments did not act in the same way, it was explained by assuming differences in rhythmical development and in the nature of the products.

These experiments are of interest to both theoretical and practical horticulturists. The author thinks that it will be easy to provide cheap and simple appliances, using capillarity, in order to provide cultivated plants with the water that they require in any given soil.

43—**Studies of Apples in Oregon.**—I. WHITEHOUSE, W. E., A Study of Variation in Apples during the Growing Season in *Oregon Agricultural College, Experiment Station,* Bulletin No. 134, 13 pp.

Corvallis, Oregon, June 1916.—II. KRAUSS, E. J., Variation of Internal Structure of Apple Varieties, *Ibid*, Station Bulletin, No. 135, 42 pp. June 1916.—III. KRAUSS, E. J., and RALSTON, G. S., The Pollination of the Pomaceous Fruits. Gross Vascular Anatomy of the Apple, *Ibid*, Station Bulletin, No. 138, May 1916.

44—**Varieties of Cider Apples in France Suitable for Making Jellies.**—TRUELLE, A., in *La Vie Agricole et Rurale*, Year VI, No. 46, pp. 357-361. Paris, November 1916.

45—**Varieties of American Peach Trees Introduced into Italy.**—ZAGO, F., in *L'Italia Agricola*, Year 53, No. 11, pp. 497-498. Plaisance, November 1916.

50—**The Spruce and Balsam Fir Trees of the Rocky Mountain Region.**—SUDWORTH, G. B., in *United States Department of Agriculture*, Bulletin No. 327 (Contribution from the Forest Service, Professional Papers), pp. 1-43. Washington, 1916.

LIVE STOCK AND BREEDING

51—**The Comparative Values of the Intra-Dermal-Palpebral Mällein Test and the Examination of the Blood for the Diagnosis of Glanders.**—FROHNER, in *Monatshefte fur praktische Tierheilkunde*, Vol. 27, No. 9-10, pp. 416-424; No. 11-12, pp. 465-541. Stuttgart, 1916.

I. In 1915, the author was asked by the Prussian Minister of Agriculture to conduct comparative experiments on about 100 horses to decide the value of the eyelid mallein test and the examination of the blood.

From the point of view of diagnosis the two tests give practically the same results. Some cases of glanders can be proved by a blood test, and others rather by the eyelid mallein test. Thus the two tests should be combined in practice, especially if many horses are to be examined. Besides, they should be combined in such a case as when one or the other alone gives doubtful results. In cases of acute glanders, both tests may not uncommonly prove useless; then clinical examination is the surest and most generally sufficient method.

II.—From 1912 to 1916, the Prussian Minister of Agriculture again asked the writer to examine 151 horses which were to be slaughtered by order of the veterinary police as they were suspected of having glanders, as was indicated by the blood test. In 143 horses the presence of glanders was shown by the autopsy. The eyelid mallein test gave a positive result in 141 (*i. e.* 98.6 %) of the 143 glanders horses; in two it gave a negative result. Therefore the eyelid test failed in 1 to 2 % of the total number of cases of glanders. The blood test gave negative results in 5 cases out of 143, thus failing in 3 % of the cases.

For diagnostic purposes, the eyelid test is seen to be of equal value with the blood test, even for extensive researches. The author is therefore of the opinion that the combined use of the two tests should be legally enforced in Prussia in order to exterminate glanders by the veterinary police.

Many observations are given on the technique of the eyelid examination, the different methods of malleinisation and varieties of mallein, the beginning of the reaction in the eyes, the value of a rise in temperature correlated with the examination of the eyes, the proportion of leucocytes in the blood, etc.

53—**Control of Contagious Epithelioma in Chickens by Vaccination.**—MACK, W. B., and RECORDS, E., in *The University of Nevada, Agricultural Experiment Station, Bulletin* No. 84, 32 pp. Reno, 1916.

During the winter of 1914-15 and the following spring, contagious epithelioma of chickens was quite prevalent in Reno, Nevada. This disease is known in the United States by various names. Those in more common use are chicken pox, diphtheria in chickens, roup, canker, swelled head, sore head and la petite verole.

The authors had occasion to study the disease on an extensive scale, and the results of their work are published in the Nevada Experiment Station Bulletin.

54—**Larkspur poisoning of Live Stock in the United States.**–MARSH, C. D., CLAUSON, A. B., and MARSH, H., in *United States Department of Agriculture, Bulletin* No. 365, pp. 90. Washington, September, 1916.

55—**Investigations of the Palm Kernel Cake, at Leeds University.**—CROWTHER, C., in *The Journal of the Board of Agriculture*, Vol. XXIII, No. 8, pp. 734-749. London, November, 1916. (4 pages in Institute Bulletin).

Results of investigations made during the past two years by several experimenters The author discusses the question under the following heads: palatability, keeping properties, digestibility, influence on the yield and composition of milk and influence upon the composition of butter fat.

57—The Effect of Carrots on the Colour and Quality of Butter.—In *Mark Lane Express Agricultural Journal and Live Stock Record*, Vol. 116, No. 4440, page 457. London, 30 October, 1916.

The following experiment was carried out at Wye Agricultural College (England) to ascertain: 1) how long a period it takes before a change of colour becomes marked; 2) what is the minimum quantity of carrots required to alter the tint; 3) will a mixture of carrots and mangels answer the same purpose; 4) what effects have carrots on the churning character of the cream, the quality of the butter, and the percentage of fat in the milk.

For the experiment four cows of the Lincoln Red breed were picked out, the animals having calved down a few months previously.

Two of the animals were fed on 81 lb. of carrots and their ordinary allowances of cake, meal and hay. Two others were fed in a similar way, mangels being substituted for carrots. The records were taken in February and March, and the feeding reversed—*i. e.* carrots being substituted or mangels after the first month of the trial. The carrots used were Sutton's Red Intermediate.

A brief summary of the result is as follows:

Length of time before the effect on the colour is apparent. Butter made from carrot-fed cows.

1st week.—Very slight difference compared with that made from mangels-fed cows.

2nd week.—Difference more marked, less time occupied in churning and better grain and flavour.

3rd week.—A very good high coloured butter, considering the time of year.

On reversing the order of feeding, it was noticed that the colour was maintained in a diminishing degree over two or possibly three weeks, whereas the cows that had previously had mangels responded slightly to their change of food, and would, no doubt, have done much the same as the other cattle. The experiment did not last long enough to answer finally the question as to how few carrots will give the required tint, but it may be said that half mangels and half carrots gave a more saleable quality of butter than those getting a full ration of mangels.

The change of food had the effect of slightly lowering the butter fat in the milk of one cow, and practically made no difference in the others. In no case did it fall below 3 per cent.

59—Milk Production and Age.—WOODS, CHAS. D., in *Special Report of the Maine Agricultural Experiment Station for the Commissioner of Agriculture for the year* 1914, pp. 3-5. Orono, Maine, 1916.

In connection with the studies of the inheritance of milk production, in progress at the Maine Experiment Station, the problem of correction to apply to milk production records for the changing age of a cow has been studied and tables are being prepared by which it will be possible, knowing a heifer's milk record, to read off her probable production as a mature cow. Furthermore, it will be possible for a dairyman to give each one of his cows an absolute rating in comparison with advanced registry animals of the same breed at any given age. If he will keep a milk record, he can, with the help of these tables, say whether or not a particular cow is better or worse and by what proportion, than the average of advanced registry cows of the same age. The work on Holstein-Friesian and Jersey cattle is now practically completed.

61—Advances made in 1916 by the Four Leading American Breeds of Dairy Cows.—CALDWELL, W. H., (Secretary American Guernsey Cattle Club), MACMONNIES, W., (Chief Extension Dep. Amer. Jersey Cattle Club). VANDERSLICE, J. A., (Holstein Friesian Association). WINSLOW, C. M., (Secretary Ayrshire Breeders Association).—*The Field Illustrated*, Vol. XXVI, No. 10, pp. 836-837. New York, October, 1916.

62—The Selection of Dairy Cattle and the Development of Cooperative Associations for the Control of Milk Production in the United States, from 1906 to 1916. —*Hoard's Dairyman*, Vol. LII, No. 15, p. 509. Fort Atkinson, Nov. 3, 1916.

The movement in favour of cooperative associations of breeders and producers for the control of the individual production of dairy cows, in view of selection, had its origin in Michigan in 1906. In the course of the last ten years this movement has extended to 38 States, and now includes a total of 346 Associations A table in the article in the Institute Bulletin shows the development of these societies from the beginning.

46—Karakul Sheep Breeding in South Africa.—(1) HOLM ALEX., (Under-Secretary of Agriculture) in *The Agricultural Journal and Small-holder of South Africa* Vol. III, No. 18, pp. 168-174. Johannesburg, June, 1916. (3 pp. in Institute Bulletin). See also Bulletin of Foreign Agricultural Intelligence, November, 1916, No. 668.

65.—Experiments in Feeding Maize Silage to Lambs at the South Dakota Experiment Station, U.S.A.—WILSON, JAMES W., in *Dept. of Husbandry, South Dakota State College of Agriculture and Mechanic Arts, Bulletin* No. 165, pp. 377-390, 7 fig. Huron, S. D., April 1916. (3 pp. in Institute Bulletin).

The above bulletin includes the results of two experiments in feeding maize silage to lambs. It also includes results of other experiments in feeding lambs reported in previous bulletins now out of print.

The results show that maize silage is not suitable as the sole roughage ration for fattening lambs with grain. On the other hand, by adding a small quantity of maize silage to the lamb's ration, more uniform and larger gains were made than with lambs not receiving any maize silage.

67—**Studies on the Physiology of Reproduction in the Domestic Fowl: Dwarf Eggs.**—PEARL RAYMOND and CURTIS, MAYNIE, R., in *Journal of Agricultural Research*, Vol. VI, No. 25, pp. 977-1042 + Pl. CXII-CXIII. Washington, Sept. 18, 1916.

Researches carried out in the Biological Laboratory of the Maine Agricultural Experiment Station, United States.

Eggs much smaller than normal eggs are occasionally produced by domestic fowl of all breeds. These eggs usually contain little or no yolk, but occasionally a small yolk, usually unfertile but inclosed in a complete vitelline membrane. The albumen is small in amount, and often, but not always it is of a thicker consistency than the albumen of ordinary eggs. The egg membranes are normal. The shells vary in thickness over the same range as the shells of normal eggs. Sometimes it is entirely lacking, and then the egg is simply covered with a membrane. The writers suggest the name dwarf eggs for these small eggs. Among the various types of abnormal eggs produced by the domestic fowl, the dwarf egg is more common than any other type, except the double-yolked egg. In their article the writers describe:

1) The different types of dwarf eggs, both as regards shape and contents.

2) Their variation in size and shape.

3) The interrelations of the variations in dimensions, shape and size.

4) The frequency of the occurrence of dwarf egg compared to normal eggs and of dwarf egg producers compared to birds which do not lay dwarf eggs.

5) The seasonal distribution of dwarf eggs.

6) Dwarf egg production by fowls with normal and with pathological oviducts.

7) The relation of dwarf egg production by normal fowls to the age of the fowl, and the position of the egg in the litter and clutch.

7) The physiological conditions leading to dwarf egg production.

9) The relation of dwarf egg production to other abnormal phenomena of reproduction which occur in nature, or have been experimentally produced.

10) The contribution which the study of the physiology of the production of dwarf eggs makes to our knowledge of the normal physiology of egg production.

The results of this study are summarized in this article and their meaning explained in thirty-six numbered paragraphs. The significance of a few of the results is here given as follows:—

18) From 1908-1916, 5.15 per cent of all the fowls kept at the Maine Agricultural Station are known to have produced at least one dwarf egg.

19) Both the actual dwarf egg production and the number of dwarf eggs per 1000 eggs is lowest during the winter months. It increases through the spring, reaching a maximum in the early summer.

20) In general, the season of high normal egg production is also the season for high dwarf egg production both actual and relative to normal egg production. The maximum of dwarf egg production, however, occurs later in the season than the maximum normal egg production.

21) The production of a dwarf egg is usually an isolated phenomenon occurring only once or twice during the life of a bird. Only 3.5 per cent of the fowls which produced one or more dwarf eggs produced more than 2.

22) A study of all the egg records and the available autopsy records for fowls which produced one or more dwarf eggs shows that in most cases the disturbance which caused the production of the dwarf egg was of temporary character, and was not correlated with a morphological disturbance of the sex organs.

68—**Trigona williana and Trigona amalthea, Wild Bees attacking the Hive Bee in the Amazon Region, Brazil.**—VAN EMMBLEN AMERO, in *Chacaras e Quintaes*, Vol. XIV, No. 4, pp. 758-759. 1 Fig. San Paulo, October 15, 1916.

The Director of the Agricultural Experiment Station of Cachoeira Grande, in the Amazon Region, has sent to the Author specimens of *Trigona amaltha* Oliv. and *T. williana* Friese, which have completely destroyed the hives of *Apis mellifica* belonging to the Station.

The author describes these two enemies of the hive bee and recalls that a few years ago he had attempted to introduce the breeding of *Apis ligustica* (Italian bee) and of *Melipona* sp. ("Mandaca" bee) into Ceara, but the *Trigona* exterminated the swarms of the two species in spite of preventive measures (destruction of the nests of the enemy insects).

FARM ENGINEERING

72—**A New Device to Increase the Power of Tractors.**—*Le Génie rural,* Year 8, No. 64, pp. 10-11, 2 fig. Paris, October, 1916.

78—**A Device for the Automatic Regulation of the Humidity of the Air.**—*Scientific American* Year 72, No. 41, pp. 355. New York, October 14, 1916.

80—**The Ventilation of Farm Buildings.**—I. GRISDALE (Director, Dominion Experimental Farms) and ARCHIBALD, E. S., in *Dominion of Canada, Department of Agriculture, Dominion Experimental Farms Bulletin* No. 78, pp. 32, fig. Ottawa, May, 1914.—II. *The Agricultural Gazette of Canada,* Vol. 3, pp. 598-600, fig. Ottawa, July, 1916.—III. TRUEMAN, J. M., the King System of Ventilation, *Ibid.,* pp. 615-618, fig.

81—**Arrangement for Securing the Safety of Horses in Case of Fire.**—*Scientific American,* Vol. CXV, No. 15, pp. 326 and 338, 2 fig. New York, October 7, 1916.

A device used in a stable in Los Angeles (U.S.A.), composed of ordinary stalls, provided with mangers and racks; the end of the stall by the horse's head is closed by a door so mounted that it opens by its own weight as soon as the holding bolts are withdrawn. The bolts are controlled by a wire running along the wall of the stable and which has easily fusible plugs placed at equal distances apart. If fire occurs anywhere, the plugs melt, open the bolts and the door of each stall automatically opens. At the same time, a door closes at the entrance to the stall, preventing the animal from going into the stable. In addition, the mangers fall automatically, thus freeing the halter; the noise caused by the opening and closing of the doors and the fall of the mangers, is sufficient to frighten the horses which, as has been shown by experiment, quickly escape by the outlet that opens in front of them.

82—**A Portable Sheep Shelter on a Farm in Central New York.**—*The American Agriculturist,* Vol. 98, No. 16, p. 8, New York, October 14, 1916.

This comparatively cheap apparatus protects the sheep from the hot sun in summer and serves as a shelter for the sheep to huddle together on cold nights in spring and autumn. It consists of a 4-sided roof mounted on 4 broad-tyred wheels, which enable it to be easily moved about.

AGRICULTURAL INDUSTRIES

92—**The Preparation and Uses of Wood Flour.**—KRESSMANN, F. W., in *Scientific American,* Vol. LXXXII, No. 2127, p. 229. New York, October 7, 1916.

Wood flour is ground or milled wood that has been screened so as to remove coarse particles and also to give a certain uniformity of size. It is usually sold as 40, 60, or 80 mesh (bronze wire screens having 40, 60, or 80 meshes per linear inch). In one specification, 20 per cent of the flour must pass through an 80 mesh, 50 per cent through a 60 mesh, and 100 per cent through a 50 mesh screen.

Before the war, wood flour was delivered at the Atlantic ports of the United States for from $12.50 to $15.00 per ton, and domestic material had to compete against this. The production in the United States is mostly controlled by one firm though mills are scattered all over the country from Maine to California.

Wood flour is principally used in the manufacture of dynamite, linoleum, artificial plastics and flooring, and as an inert absorbent in many industries.

In 1909, the amount of wood flour used for making dynamite amounted to about 20 million pounds, and is increasing every year.

93—**The Pasteurisation of Milk for Cheese-Making.**—STEVENSON, C., and GRANT, W., (Dairy Instructors, Taranaki, New Zealand), in *New Zealand Department of Agriculture, Industries and Commerce, The Journal of Agriculture,* Vol. XII, No. 6, pp. 440-445, 3 fig. Washington, June 20, 1916.

According to the writers, (dairy-instructors at Taranaki, New Zealand) it was hitherto thought impossible to pasteurize the milk used for cheese-making on account of the large quantities of milk to be dealt with in the limited time available for the purpose, and the high cost of the necessary heating. The increase in fuel consumption was from 15 to 20 per cent. A saving, however, can be effected by using a regenerative heater. Where water is scarce, the waste water can be cooled and used again. The best pasteurizing temperature is from 71° to 75° 5 C. If the temperature is raised to 79° C., or above, the addition of 1 oz to 1½ oz. of hydrochloric acid per 100 gals. of milk, before adding the rennet, will be found to be an advantage.

Benefits derived from the pasteurisation.—The loss of milk which occurs in exceptionally warm weather of long duration is avoided.

There is a considerable increase in the amount of butter fat incorporated in cheese made from pasteurized milk. Instances of this were observed at Taranaki, for since pasteurisation has been adopted, not a single second grade cheese has been manufactured (a large percentage being obtained before), and the factory's average grade has risen from 89 points to 92. Thus the factory saves ½ cent per lb., which was the deduction for second grade cheeses. These satisfactory results have induced cheese manufacturers to increase the number of plants for pasteurizing milk; from 7 in 1914-15 they have increased to 32 in 1916.

A complete plant of 1,800 gallon capacity can be installed for $1,500.

It should not, however, be supposed that the good effects of pasteurisation lessen the responsibility of the farmer as regards the quality of the milk, which will always remain the chief factor in determining the quality of the cheese made.

For instance, an experiment at Taranaki has shown that turnips fed to cows impart to the milk an unpleasant flavour which cannot be entirely eliminated by pasteurisation at 87.7° C.

94—**On the Mechanical Protection and Conservation of Eggs.**—ARNOUX ANDRE, in *Comptes Rendus de l'Académie des Sciences*, 1916, 2nd half year, Vol. 163, No. 23, pp. 721-722. Paris, 1916.

The writer has sought a practical and cheap method for helping transport and conservation and requiring no special apparatus. To do this, the egg is wrapped in a soft envelope formed by bands of tissue which are dipped in a mineral paste that hardens and protects the egg.

Amongst the substances suitable for this, silicate of soda, already used for this purpose, gave the best results. The egg thus preserved is protected from shock and travels as if in a box. In practice the egg is still quite fresh at the end of about a month.

For consumption the egg is dipped into tepid water, when the mineral paste easily dissolves. Envelopes other than bands of tissue may be employed (wadding, saw-dust, etc.,); and other food products are capable of being similarly protected.

95—**The Strength of Eggshells.**—HERRASTI G., in *Scientific American*, Vol. XCV, No. 15, p. 321, 1 fig. New York, October 7, 1916.

The strength of eggshells has been ascertained by placing them on the plate of a pair of scales and submitting them to gradual pressure by means of a lever and jack. It was found that coloured egg shells are stronger than white ones. The average breaking pressure for brown shells reached 154.8 lb., while white shells only required 112.4 to break them.

PLANT DISEASES

96—**The Noxious Action of Sea-salt deposited on Sea-shore Plants.**—DUFRENOY JEAN, in *Comptes Rendus des Séances de la Société de Biologie*, Vol. LXXIX, No. 17, pp. 914-916. Paris, 1916.

100—**"Uspulun" a New Preparation for the Treatment of Cereal Grains against Fungoid Diseases.**—WEEK in *Illustrierte landwirtschaftliche Zeitung*, 36th year, No. 82, p. 552. Berlin, 1916.

A new preparation for the treatment of seed of grain known as "Uspulun", has been placed upon the market and is said to be capable of destroying all fungal spores occurring on the surface of the grain. The diseases in view are chiefly "stinking smut of wheat", the *Fusarium* attacking wheat and rye, *Helminthosporium gramineum* of barley and, according to ERIKSSON, "loose smut of oats" (*Ustilago avenae*). The remedy might also be adopted for seed attacked by bean anthracnose (*Gloeosporium Lindemuthianum*) and pea anthracnose (*Ascochyta Pisi*).

The active principle contained in the remedy is chlorophenate of mercury, in the proportion of about 20 %. The remaining 80 % is made up of various agents intended to render the preparation more soluble and to protect it from moisture.

The mercury content is about 12%. To ensure recognition of seeds treated with "Uspulun" a blue colouring matter has been added.

Experiments covering a period of three years have been carried out at the Agronomical Institute of Giessen University in order to determine the effect of "Uspulun" treatment on the germination of the seeds and on the action of the fungi during germination.

It was also wished to determine whether "Uspulun" really constitutes an effective remedy for the control of "stinking smut". If so, the next question to be studied is that of expense. For comparative purposes, the seeds were also treated with copper sulphate, formalin and sublimate.

I.—*Effect on Germination and Action of the Fungi.*—The seeds were immersed in the "Uspulun" solution and allowed to remain there for some time. No spraying was carried out, the effect of the solution on the germination capacity being less marked by this method than by the immersion process.

The germination energy and germination capacity of rye and barley were increased several degrees by the treatment with "Uspulun".

The germination energy shows a stronger increase than the germination capacity. The reason is to be found in the destruction of the fungi, especially of *Fusarium,* which impeded the course of germination in the non-treated samples.

The favourable effects of the treatment were shown still more distinctly in the case of the determination of the growth capacity. The optimum value of concentration of the solution was almost in every case from 1:200 and 1:400 (the instructions given by the manufacturers say: 1:400). Rye forms an exception as its germination energy only shows an increase with the weakest of all the solutions i. e. 1:800. Treatment with "Uspulun" produces no increase in the germination capacity or in the growth capacity of barley and oats.

Sublimate (15 minutes immersion in a 0.1 % solution) diminished the germination energy of wheat. On the other hand the germination capacity remained unchanged. There was a distinct increase in the growth capacity in comparison with the non-treated samples, as was also the case with "Uspulun" this increase, however, was 20 % less than with "Uspulun". The germination capacity and the growth capacity were the same as those of the samples treated with "Uspulun". The growth energy and the growth capacity showed an increase of nearly 10 % on those of the non-treated samples.

The treatment with sublimate had no adverse action whatever on the germination capacity and growth capacity of barley and oats; however, it lowered the germination energy of the barley.

The wheat grains seemed to have suffered no damage from an immersion of a quarter of an hour in a 0.1 % solution of formalin. The germination capacity and the germination energy remained the same as for the non-treated seeds. On the other hand there was a big difference in the growth capacity.

The effect of formalin on rye was similar. The germination value was slightly diminished for oats and remained unchanged for barley.

Copper sulphate (0.5 % solution; 15 hours immersion) usually had a very deleterious effect on the germination of rye and wheat.

It is true that a subsequent treatment with milk of lime caused an appreciable improvement in all the factors, however, they were superior to those of the untreated samples in one single case only (growth capacity of wheat). The results of treatment with copper sulphate were no better for barley and oats, although in this case also, the factors may all have been considerably improved by a subsequent treatment of the seeds with milk of lime.

Treatment with "Uspulun" surpasses all the other methods examined. Next comes corrosive sublimate, and then formalin and finally copper sulphate, with and without treatment with milk of lime.

II.—*"Uspulun" as a remedy for "stinking smut".* As early as 1915, field trials were made on the control of "stinking smut" and "loose smut of oats" but without result owing to the failure to produce artificial infection by means of spores. A new attempt was made in 1915 with autumn wheat severely attacked by "stinking smut" and this time the experiment was successful. The results are as follows:

Treatment of seed.		Growth	Proportion of wheat attacked by stinking smut
Untreated	washed	good	37.8
	dry	"	50.8
"Uspulun"	immersed	very good	0.0
	sprayed	"	1.5
Sublimate	immersed	slightly irregular	0.0
Copper sulphate	immersed	irregular with gaps	0.0
Copper sulphate followed by treatment with milk of lime		good	0.27
Formalin		good	0.1

The expenses of treatment with "Uspulun", when the spraying method is adopted, are from 6½ to 8 cents per acre for wheat; from 5 to 6 cents per acre for rye. The immersion method comes dearer for small quantities of seed, but comes as low as 8 cents per acre for large quantities.

AGRICULTURAL ECONOMICS

FEDERAL BANKS AND FINANCIAL OPERATIONS IN THE UNITED STATES

Financial and banking organization in the United States, certain defects of which were repeatedly pointed out by financial experts and economists and were thrown into relief by the crisis of 1907, has undergone in recent years a significant transformation.

Recurrent and multiplied attempts, and also numerous failures, profound study and the resultant minute knowledge of the country's real needs and political necessities, seem at last to have led the government of the States to institute a new organization of banking, grafted on the surviving trading organization and aiming at providing remedies for the crisis which may eventually threaten the equilibrium of the money market.

The law of 23 December 1913, which created the Federal Reserve Banks, gives its bases to the new system and is modified and amplified by a law of 7 September 1916, which is connected at several points with the law on agricultural credit of 17 July 1916.

The new organization represents, as we shall show in examining its outstanding features, a measured compromise between two political and economic principles—complete centralization and localization—which in turn have left their mark on the law and administration of the North American republic since first it was formed, and which the force of experience and of a union of social forces tend more and more to merge.

The article first gives a general review of financial organization in the United States. After two attempts to form a federal bank Congress decided to care in future for its own funds, instituting, under the control of the administration, centres of deposit and sub-treasuries in the principal towns. This was the so-called system of sub-treasuries which was adopted in 1846 and is still in force, but has been amended to allow surplus funds to be deposited in the National Banks. In this period the number of "State" Banks privileged to issue circulating notes, increased largely. The National are differentiated from the State banks because they may be founded in any territory of the union and issue notes, secured by a pledge of United States stock, which are legal tender.

The lack of elasticity in the financial system, which rendered it unable to meet the crisis of 1907, caused Congress to decree that there should be a National Monetary Commission, charged to examine the financial and banking situation in all its aspects in the United States and in the principal European countries. This commission favoured a greater centralization of the banking system. It did not however propose the establishment of a single federal bank on the model of the great national banks of Europe, but the creation of a Reserve Association of America which would have the necessary authority and means to increase and reduce the volume of paper money in circulation as circumstances demanded. Congress on 23 December 1913 voted the Act creating the Federal Reserve, in accordance with the principles and the hopes which the commission had enunciated.

In accordance with this Act the territory of the Union was divided into twelve districts and it was decided that the banks should be at Boston, New York, Philadelphia, Cleveland, Richmond, Atlanta, Chicago, St. Louis, Minneapolis, Kansas City, Dallas and San Francisco. Every National Bank is required to subscribe to the Federal Reserve Bank of the district in which it is situated six per cent of its own paid-up capital stock and surplus in gold or gold certificates. If the capital thus subscribed be insufficient a certain amount of the stock may be allotted to the government. No Federal Reserve bank may begin business with a subscribed capital less than $4,000,000.

Each Federal Reserve Bank is under the supervision and control of a board of nine directors, of whom three represent and are chosen by the stockholding banks, three must when elected be actively engaged in their district in commerce, agriculture, or other industrial pursuit, and three are nominated by the Federal Reserve Board. The chairman of the board of directors is chosen by the Federal Reserve Board from the last named three, and also has the office of federal reserve agent, acting as official representative of the Federal Reserve Board for the performance of the functions conferred on it by the Act.

The Federal Reserve Board which meets in Washington is the motive power of the whole system. It has seven members, namely the Secretary of the Treasury and the Comptroller of the Currency who are members *ex officio*, and five others appointed to hold office for ten years by the President of the United States with the consent of the Senate. In appointing them the President has due regard to a fair representation of the different commercial, industrial and geographical divisions of the country, and he designates one of them as governor and one as vice-governor of the Federal Reserve Board, the former being the board's active executive officer.

Previously National Banks were obliged to have a reserve equal to 25 per cent of the amount of their deposits in the reserve towns and 15 per cent in the other towns; but the Act of 1913 made this percentage 18 in New York, Chicago and St. Louis, 15 in other reserve towns, and 12 in non-reserve towns. The excesses of available reserves should be transferred in accordance with certain conditions to the Federal Reserve Bank.

For twenty years from 1915 the member banks of a Federal Reserve Bank may apply to sell all or some of their circulating notes which they desire to retire. The Federal Reserve Board will decide on such applications. A Federal Reserve Bank may not purchase more than $25,000,000 of such bonds in a year. Upon depositing with the Treasurer of the United States bonds so purchased, or any bonds with the circulating privilege acquired under this Act, any Federal Reserve Bank shall receive from the Comptroller of the Currency circulating notes in blank equal in amount to the par value of the deposited bonds. Such notes shall be issued and redeemed on the same terms and conditions as National Bank notes, except that they shall not be limited to the amount of the capital stock of the Federal Reserve Bank issuing them. Thus the circulation of notes will eventually be appreciably simplified and unified.

The law perfects the machinery for controlling the banks. In addition to the inspections by the Comptroller of the Currency, inspection of any bank by the Federal Reserve Bank of its district can be authorized by the Federal Reserve Board. The Federal Reserve Banks are themselves inspected annually and their member banks can obtain that they be inspected specially.

Both abroad and at home these banks are the government's fiscal agents, and as such recover taxes and duties, pay arrears of the public debt, etc.

The Federal Reserve Banks were opened on 16 November 1914. Of the 7,493 National Banks which were active only eighteen refused their subscription. In June 1916 the paid-up capital amounted to $54,864,000. On 17 June 1916 they held United States bonds for $59,000,000. Of municipal bonds, which are far less liquid, they then held $22,300,000. Their foreign paper amounted to $64,953,000.

On 10 November 1916 the liabilities of the Federal Banks amounted to $650,000,000, represented as to one-tenth by the paid up capital stock and as to nine-tenths by the deposits of stockholding banks. Their own bills have hitherto circulated little, circumstances not rendering them necessaries. Their assets amounted to $400,000,000 in gold, $110,000,000 in paper, a certain quantity of their bills, and accounts with neighbouring banks.

The unification which the federal reserve system was designed to effect was shown first by the adoption of a method of weekly settlements of accounts among the various federal banks, the difference between the debit and credit sides of such accounts being rectified by a remitment of specie or bills. The deplacement of assets from one district to another is thus reduced to the minimum. In the second place since 15 June 1916 the recovery without charge of cheques and bills has been enforced by the Federal Reserve Board.

The Act of 1916 has enlarged the activity of the Federal Reserve Banks, notably in that it allows them to accept bills of exchange of home origin which are sufficiently guaranteed. It further allows the Federal Reserve Board to authorize "member banks to carry in the Federal reserve banks of their respective districts any portion of the reserves" previously required to be held in their own vaults; and in that it increases the facilities of member banks for short term credit, secured by bills not actually discounted. Any national banking association may apply to the Federal Reserve Board for permission "to establish branches in foreign countries or dependencies or insular possessions of the United States for the furtherance of the foreign commerce of the United States and to act if required to do so as fiscal agents of the United States".

Owing to the initial deposit of the reserves of member banks and the transfer allowed by this Act the Federal Banks now hold about a quarter of the country's grand stock of gold.

Such is in outline the financial and banking system instituted in 1913 and revised in 1916. It is seen to have involved no radical upheaval of the previous organization. It merely added some new wheels which centralized, and in some respects gave a new direction to the complex and somewhat unequal mechanism constructed since the beginning of the republic. The State Banks, the National Banks, the subtreasuries, the circulation emanating from banks in direct contact with the people and secured by Federal debt bonds, were not abolished. They subsist. But the concentration of a considerable part of the national gold reserves in a small number of Federal banks, which could issue Federal notes in case of need, makes incontestably a regulating force in the money market, and will probably ensure the normal course of commercial and banking operations in times of crisis.

(Summarized from the International Review of Agricultural Economics, April 1917).

WOMEN WORKERS ON THE FARM IN BRITAIN

The suitability of women to perform many of the branches of farm and horticultural work was recognized at an early date of the war, and in order to promote their employment special steps were taken by the Board of Trade, acting in conjunction with the Board of Agriculture. The progress made in the substitution of women for men in agriculture has been slow, and is in no way commensurate with that achieved in industrial and commercial occupations. The difficulties attendant on the work have been most serious. Prejudice on the part of the farmers, reluctance on the part of the women, insufficiency of housing accommodation, lowness of wages, have all proved serious obstacles.

To try to overcome these difficulties, a campaign of propaganda work was instituted in the spring of 1915 by the Board of Agriculture and the Board of Trade. As a result of the combined action of the boards, local voluntary committees, known generally as Women's County War Agricultural Committees, have been formed. At the present time there are sixty-three such committees, whose function is:

1) To carry on propaganda work to promote the employment of women in agriculture.

2) To register women, and arrange for placing them in work and for their training where necessary.

3) To increase the production of home-grown food in every village.

The organization which it has been sought to establish has been in the nature of a county committee working through local committees or village registrars—the usual procedure being to divide the county into districts, each having a representative. The representatives form the county committee, in charge of the general organization and each of them is responsible for the work carried on in his or her own locality by means of a district committee or a registrar, or both, appointed in each village. There are now 1,060 district representatives and 4,000 village registrars. In some cases the Women's County Committees have a separate existence, although they work in cooperation with the men's County War Agricultural Committees, called into being by Lord Selborne in August 1915. In others they are sub-committees of the War Agricultural Committees.

A certificate has been issued to workers at the discretion of the committees, at the time of registration or only after proved service, or in some cases not at all. After they have completed thirty days' service on the land, registered women are entitled to wear a government armlet of green baize which bears the royal crown in scarlet. 72,021 certificates and 62,000 armlets have been issued.

It has been very difficult to obtain statistics from the committees and such as they have supplied are not reliable. The approximate returns indicate that nearly 140,000 women have been registered, including all who have volunteered both for whole and for part time service. In certain counties—as Northumberland, Wilts, Devon, Kent and parts of Lincolnshire—and also in Wales, women have always been on the land in large numbers, and many of these do not care to register as they think that by so doing they may make themselves liable to some form of compulsory service. In one of the divisions of Lincolnshire, for instance, 599 women have been returned as registered and 2,041 as working; and in many villages the registrars can give no accurate idea of the number working as the farmers so frequently make their own independent arrangements. It appears that the comparatively small demand by farmers for the service of women up to the last few months has been due in the main to the following reasons:

(1) The number of farm labourers exempted.

(2) The fact that the shortage of labour has been largely met by:

- *a*) Release of soldiers.
- *b*) Release of school children.
- *c*) Increased use of machinery.
- *d*) A lower standard of cultivation.

(3) The unwillingness on the part of large numbers of farmers to employ women.

(4) The difficulty of providing accommodation for imported women. The housing problem in rural districts, already existent before the war, has been much intensified by the fact that the wives and families of men who joined the colours have been permitted to remain in their cottages. The result of this has been that the farmer has often been unable to replace the men by other men or by women.

The work undertaken by the women worker on the land is of a diverse character, and includes some occupations which do not in any way, as a rule, fall within the women's province.

The following is a list of occupations in which women have been and are now engaged in various parts of the country:—

1. General farm work—(*a*) cleaning land; (*b*) stone picking; (*c*) weeding; (*d*) thistle cutting; (*e*) manure spreading; (*f*) singling and hoeing turnips; (*g*) potato setting and lifting; and (*h*) vegetable planting and transplanting. 2. Milking. 3. Stock tending and rearing. 4. Butter

making. 5. Cheese making. 6. Poultry rearing. 7. Haymaking. 8. Harvesting. 9. Sheep shearing. 10. Thatching. 11. Stacking. 12. Ploughing. 13. Loading and unloading. 14. Threshing. 15. Fruit picking. 16. Hop picking. 17. Reed stripping. 18. Bark pulling. 19. Timber felling. 20. Gardening—(*a*) jobbing; (*b*) market gardening; (*c*) domestic gardening; (*d*) cultivating allotments and waste land; and (*e*) co-operative gardening.

The experience gained during the war goes to prove that some women can do anything and everything on the land, and do it well, but that the average woman is useful chiefly for occupations 1 to 7 and for 15, 16 and 20. In numbers 2 and 3 they have shown themselves very successful.

CONTENTS OF THE INSTITUTE ECONOMIC BULLETIN

In addition to those already dealt with herein, the following is a list of the more important subjects treated in the April number of the International Review of Agricultural Economics. Persons interested in any of the articles in this list may obtain the original bulletins on application to the Institute Branch, so long as the supply for distribution is not exhausted.

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AGRICULTURAL STATISTICS

FOREIGN CROP CONDITIONS

THE following is a summary of the information on crop conditions on July 1st given in the July number of the *International Crop Report and Agricultural Statistics*:—

The hot weather and rains which have prevailed during June throughout western and southern Europe have been favourable for all crops, improving the outlook for the greater portion. In France, in Great Britain, in Ireland and in Italy a very notable advance is reported as to the *winter-sown* crops, which had suffered from the rigour of the season, so generally; so that though a yield above the average is out of the question, the present forecast is much more propitious than could have been expected from the recent state of these crops.

The *spring-sown crops*, generally speaking rather later than usual, have made up for lost time as a consequence of last month's weather, and their condition is almost everywhere an entirely satisfactory one. In northern and central Europe, on the contrary, there is still room for complaint as regards the growing crops. In Denmark the present situation points to a crop decidedly below average, and gives cause for some anxiety. In Sweden the crops have made but little growth owing to the cold winter, the lateness of the spring and the serious drought which has lasted so long in that country. In Switzerland, on the other hand, the winter crops are well advanced in spite of drought, and an average yield is expected. The spring crops have felt the effects of the dry weather more decidedly. The same conditions prevail in European Russia, where an important improvement in crops is reported to be principally due to the recent rainfall.

The condition of the *wheat* crop on July 1st, 1917, was good in Spain, average in Ireland, Italy, Switzerland, and the United States, while it was mediocre in Denmark, Great Britain and Sweden. *Rye* is doing well in Spain and Ireland; it is in average condition in Itlay, Switzerland and the United States; and mediocre in Denmark and Sweden. The *barley* crop is good in Spain, Scotland and Ireland, average in England, Italy, Switzerland and the United States, and mediocre in Denmark and Sweden. As regards *oats*, the outlook is good in Spain and the United States, average in Scotland, Ireland, Italy, Switzerland. It is mediocre in Denmark, England and Sweden. *Corn* looks well in Spain, Italy and Switzerland, and is in average condition in the United States.

The August report of the United States Department of Agriculture predicts a wheat crop of 653,000,000 bushels, compared with a harvest of 639,886,000 in

1916. The estimates for the other crops are:—Corn 3,191,000,000 bushels against 2,583,000,000 last year; oats 1,456,000,000 against 1,251,992,000; barley 203,000,000 against 181,000,000; potatoes 467,000,000 against 285,000,000.

Broomhall's latest crop cable issued August 28th, is as follows:—

United Kingdom.—Rains have caused some damage in the south, elsewhere rain caused delay in threshing and early movement. Wheat prospects fair, with quality good. Oats fair, potatoes excellent, and hay abundant.

Russia.—Crop reports varied; in important spring wheat section outlook bad, and enemy's troops have invaded a large section of Bessarabia. Stocks everywhere are Government owned, and new movement is light.

Rumania.—Crop outlook good and harvesting finished, but Russian retreat makes it difficult to expect saving the crop.

Bulgaria.—All advices are highly favourable. A large crop was harvested of wheat and oats. Movement overland large.

Greece.—All neutral advices via Switzerland reports severe storm damage. Bread rationing increased.

Italy.—Wheat crop giving average yield; owning to reduced acreage total yield will be much under last year. Stocks small and foreign arrivals increasing.

Spain.—Weather favourable, and harvest reports keep favourable.

France.—Weather generally more favourable. Harvesting reports keep fairly favourable as to quality, but yield disappointing. Import needs large, and purchases from foreign sources large, with arrivals of both wheat and oats liberal.

North Africa.—Crops of fair quality and quantity.

Scandinavian Peninsula.—Rains came too late. Cereal and hay crops well below average. Supplies small and purchases difficult, with arrivals at all ports practically nothing.

Australia.—Weather favourable. Large decrease in acreage confirmed. Stocks continue heavy.

DOCUMENTARY LEAFLETS OF THE INTERNATIONAL INSTITUTE OF AGRICULTURE

THE Bureau of Statistics of the Institute has inaugurated the publication of various items which are outside the scope of information hitherto furnished by the Bulletin of Agricultural and Commercial Statistics. The new information will be published in supplements entitled "Documentary Leaflets." The items will be selected with the view of supplying a review of the agriculture of various countries and of all kindred questions, to be made as complete as possible. The data will deal especially with yield, trade, stocks, prices, rates of freight, etc. The information will generally be from official sources, but if it is considered advisable to publish non-official data the authority will be quoted. The new publication will make it practicable to supply the world at large with most useful information concerning a great number of products, such as rubber, cocoa, tea, jute, wood, fruit, meat, hides, etc.

The first issue of the "Documentary Leaflets," which will be distributed with the "International Crop Report and Agricultural Statistics," has been received at the office of the Canadian Commissioner.

Following are summaries of some of the items:—

Exports of Jute from British India.—The following data was furnished by the Director of Statistics of British India:—

	1915 metric tons	1916 metric tons.
Jute (raw)...........	659,445	532,468
Jute (manufactured):		
Bags (estimated).	453,756	486,054
Cloth (estimated)	312,324	322,770
Twist and yarn..	82	1,566
Rope and twine..	3,689	3,963
Totals...	1,429,296	1,346,821

Requirements for Cereal Consumption in the Netherlands.—The consumption of cereals in the Netherlands in 1916-17, compared with the estimates of normal requirements as published in the "Statistical Notes of the Institute."

	Home grown crops in 1916 + imports in 1916.	Total normal requirements for consumption in 1916-17 according to the tables of the Institute.
	Bushels.	Bushels.
Wheat...........	32,191,000	30,497,000
Rye.............	11,192,000	23,747,000
Barley..........	8,061,000	11,161,000
Oats............	21,852,000	26,047,000
Corn............	27,514,000	28,337,000

Cost of Wheat in France.—The Journal *Officiel* of France, dated June 30th, 1917, reports a speech in the Senate on the previous day by Mr. Millies-Lacroix. It contains interesting information as to the results of the measures adopted for food supply as regards wheat. The following is a quotation from the speech:—

> "The food supply service was definitely organized in October, 1915. The law of October 16th, 1915, entrusted to this service the arrangements for wheat and flour supplies for the civilian population, and placed at its disposal a credit of $12,000,000 as working capital. In order to keep in touch with current receipts and payments, a special account was opened, taking credit for the amount of working capital voted, as also for cash received against deliveries of wheat and flour and by requisition, and with supplementary expenses of transport, loading and discharging, receiving and hauling, warehousing, holding and distribution of the goods.
>
> "A quarterly statement of profit and loss must be supplied to the Finance Minister. I have inserted in my report some extracts from these statements. The first one, after about a year's transactions, showed a loss of $28,400,000, to which amount should be added customs duties and registration fees paid by the service, together with sundry charges incurred by receiving agencies, etc. At a later date the loss increased from $28,400,000 to about $80,000,000; to which again should be added $45,000,000 customs duties and registration fees, with agency charges. The payments have now reached an amount approximating $340,000,000, and the receipts have been about $175,000,000, leaving a deficiency of $165,000,000. I should state that this deficiency was not unexpected by Parliament, where it was known that, in creating the food supply service, serious loss was likely.
>
> "M. Joseph Thierry, Finance Minister, gives us information which includes the following statement. I have no wish to enter into details of the transactions, but I may say that the deficiency chiefly arises from the distribution of wheat by the Government at $1.70 per bushel on an average, costing at least $2.50. Foreign wheat is very dear; it has risen to $3.90 per bushel, including insurance and freight, particularly if the average cost is to allow for possible loss by submarines So that there is a large deficiency on this special account of food supply service, since we are still providing the public with wheat at a loss every day."

Government Monopoly of Cereals in Russia.—Consequent on the decree as to monopoly of the cereals, the Provisional Government under date of May 13th, 1917 (old style) has issued regulations dealing with the requisition of wheat, rye, barley, oats, maize and their products. The Government officials are to requisition all stocks excepting what is necessary for the sustenance of the holders.

Encouragement of Production in Italy.—In order to facilitate the operation of loans intended to encourage production of cereals, vegetables and root crops, a decree of the Lieutenant General of the kingdom, published in the *Gazetta officiale* on June 30th, 1917, enacts that loans of an aggregate maximum of $4,000,000 may be granted to agricultural credit associations. The interest to be paid by these associations is fixed at 3%. Decrees of the Ministers of Agriculture and Finance acting in concert will determine in each case the amount of the loans to be allotted to individual agricultural associations.

Condition of the Crops in the Ottoman Empire.—The *Frankfurter Zeitung* published on June 9th, 1917, the following information as to the condition of crops in the Ottoman empire under the heading of "information from the special department of the Ministry of Agriculture":—

Advices received from all parts of the Ottoman Empire encourage the belief that, consequent on the efforts of the agricultural authorities, the area as a whole exceeds expectations, and reaches more than two-thirds of the normal.

Owing to favourable spring rains the harvest promises to be very good, and, unless something unforeseen occurs, the yield will be equal to the best pre-war harvest, more particularly to that of 1910. In order to remedy the scarcity of labour, agricultural machines were imported from Switzerland, Sweden and Norway. During May there was serious danger from invasion by locusts, but this passed away with their destruction.

Prices for Seed Wheat in Britain.—The food production department of the Board of Agriculture and Fisheries notifies that, in view of the necessity of providing seed wheat for early spring sowing next season, the Department is prepared to buy seed wheat of the 1916 crop threshed after June 1st, 1917, and until further notice to offer such wheat a premium above the maximum price for milling wheat.

(Crop 1917).—The Department also proposes to acquire pure stocks of certain of the less plentiful varieties of winter-sown wheat from the crop of 1917. Crops in adequate quantity found after inspection to be suitable for seed will be purchased at a substantial premium above the milling price.

Regulations in Austria.—According to the *Pester Loyd* of Budapest, June 22nd, 1917, the Official Gazette of that date publishes a decree relating to the seizure and requisition of cereals of the crop of 1917.

A maximum allowance of 33 lb per head per month is to be made to all male agricultural workers of over fifteen years of age. This allowance is to include wheat, rye, meteil and barley taken in their aggregate.

The maximum for other workers and members of their families will be 26½ lb.

Non producers are prohibited from purchasing more than 26½ lb. per month. Administrative bodies must not supply more than 15½ lb. of flour per head per month to persons under their control. The people's food department will define the quantities to be allotted to workers under strenuous conditions.

The *Landwirthschaftliche Zeitung* of Vienna, June 13th, 1917, publishes an order dated May 26th, 1917, of the council of ministers, respecting the arrangements for threshing incumbent on the owners of cereals. The authorities may fix a period for this operation, and on its expiry may proceed with the threshing at the cost and risk of the owner. In case of need they are empowered to act without any such delay reimbursement of the usual charges to be made.

The *Wochenschrift des Zentralvereins fur die Rubenzucker-Industrie* (sugar beet industry) of Vienna, June 6th, 1917, inserts the text of a ministerial decree of May 26th, 1917, prescribing the seizure for benefit of the state of home-grown cereals and vegetable produce at the beginning of the harvest. Contracts for sale of any such products are prohibited, and sales already made will be considered as null and void. The growers may retain the quantity requisite for food and seed.

Regulations in Germany.—The *Reichsanzeiger* (official) of May 21st, 1917, announces that a premium of $23.80 at par per 2200 lb., in addition to the requisition price, will be granted to growers who had carried out their obligations to deliver their oats, but who, nevertheless, make delivery before July 15th, 1917, of the remainder of such quantity as they have been permitted to retain.

The *Berliner Tageblatt* of June 4th, 1917, announces that the Federal Council has made, under date of June 2nd, a decree offering premiums in compensation of increased outlay resulting from early threshing, such premiums to be in addition to the maximum price.

The *Reichsanzeiger* (official) of May 19th, 1917, publishes a decision of the war food supply department reducing the ration of oats for the "zivilpferde" (horses not in army service) to 3.3 lb. per day.

THE WORLD'S WHEAT PROSPECTS FOR THE GRAIN YEAR 1917-1918.

BY T. K. DOHERTY

WITH the opening of the new grain year, on August 1st, the question of the world's supplies and demand has become a matter of anxious consideration among wheat producers and consumers. It is the purpose of this brief survey of the situation to make a rough forecast of the prospects with such scanty material, whether official or not, as has so far reached this office.

First is presented a statement of the world's production for the years 1916 and 1917, together—for comparative purposes—with the average production for the five-year period preceding the war. The figures for the five-year average are, with a very few and insignificant exceptions, official figures. Those for 1916 are, for the countries outside of Central Europe, also practically all official, the sources having already been indicated in the June number of the GAZETTE, page 536. The notes appended to the table will explain as far as possible the reasons for departing from previously estimated average data when official information has not been obtainable. In the case of Argentina and Australia, whose harvests only begin in December, it will be understood that we are somewhat influenced by the optimists in these countries who have up to this time sent to Mr. George Broomhall glowing reports, based on favourable seeding conditions and excellent growing weather following that period.

Following the production table there is a rough presentation of the prospective import and export situation compared with the data of the previous year in so far as ascertainable, which no doubt will have to be changed as official figures become available.

WORLD'S PRODUCTION OF WHEAT.

Countries open to the world's commerce.

Countries.	1917	1916	Five years' average (1909-13)
	Bushels	Bushels	Bushels
United States (a)	653,000,000*	639,886,000	686,694,000
Canada (b)	250,000,000	220,367,000	197,118,000
Mexico	8,480,000	8,000,000	8,480,000
Argentina (c)	200,000,000	70,225,000	147,071,000
Uruguay	6,500,000	5,390,000	6,519,000
Denmark (d)	4,500,000	6,026,000	5,344,000
France	161,670,000*	214,624,000	317,639,000
Greece	4,000,000	8,000,000	4,320,000
Italy	147,000,000*	176,531,000	183,336,000
Netherlands	4,000,000	4,034,000	4,896,000
Norway (d)	250,000	305,000	306,000
Portugal	7,440,000	8,000,000	7,440,000
Cyprus and Malta	2,400,000	2,400,000	2,400,000
Spain	141,000,000*	152,330,000	130,447,000
Sweden (d)	5,000,000	7,775,000	7,769,000
Great Britain (e)	55,000,000	57,805,000	58,043,000
Ireland	4,347,000*	2,827,000	1,597,000
India	379,307,000*	318,005,000	359,035,000
Japan	26,533,000*	28,307,000	24,166,000
Algeria	30,000,000	29,152,000	34,998,000
Egypt	35,000,000	36,543,000	34,814,000
Tunis	8,000,000	11,023,000	6,230,000
Australia (f)	150,000,000	152,090,000	90,499,000
New Zealand	7,000,000	5,000,000	7,070,000
Chili	12,000,000	12,000,000	14,000,000
Switzerland	4,000,000	4,053,000	3,314,000
The Cape	2,400,000	2,400,000	2,400,000
Totals	2,308,827,000	2,183,098,000	2,345,945,000

Countries not open to the world's commerce.

	Bushels.	Bushels.	Bushels
Austria (g)	36,500,000	48,672,000	60,840,000
Hungary	135,000,000	135,717,000	169,646,000
Belgium (g)	9,000,000	11,917,000	14,896,000
Bulgaria	34,000,000	33,951,000	42,440,000
Germany (g)	91,000,000	121,696,000	152,120,000
Poland (h)	39,000,000	52,000,000	65,000,000
Herzegovina and Bosnia (g)	1,500,000	2,048,000	2,560,000
Roumania	70,000,000	78,521,000	87,793,000
Russia-in-Europe (48 governments)	550,000,000	595,425,000	624,620,000
Russia-in-Asia	86,000,000	86,812,000	151,142,000
Persia	13,600,000	13,600,000	13,600,000
Serbia (g)	8,000,000	10,880,000	13,800,000
Totals	1,073,600,000	1,191,239,000	1,398,457,000
World's Total	3,382,427.000	3.374.337,000	3.744.402.000

NOTE.—The figures for 1917 marked by an asterisk are official, the other estimates for that year are mostly explained in the following notes:—

(a) Threshing returns show excellent quality and larger yields than anticipated at the time of this August 1st report. Especially is this the case in the winter wheat territory; so it is not unlikely that the forecast as of July 1st, indicating a total wheat crop of 678 million bushels, or even an estimate reaching the five-year average, will eventually prove to be nearer the reality.

(b) No official report has yet been published giving absolute figures. The above is a mere estimate based partly on the official percentage figures ascertained August 1st, partly on the improved conditions following that date. Samples from a large number of districts examined recently reveal exceptional high-grading quality, and a yield from 10 to 30 bushels, in most instances much higher than expected two or three weeks earlier. The estimate in the table allows for a yield slightly over 19 bushels on an acreage of 13,000,000, and assumes that 550,000 of that sown will be abandoned or used as fodder.

(c) An official estimate at the beginning of August indicates the area seeded to wheat during the present season is 17,574,000 acres, compared with 16,082,000 last year, and owing to exceptionally favourable weather conditions, a possible production of 237,000,000 bushels. As the harvest will not take place before the latter part of December we prefer not to rely on this estimate: we have used in our table an estimate based on the area as now officially reported and the average yield per acre during the best single year of the pre-war period 1909-10-

1913-14, viz.: slightly in excess of 11 bushels per acre. The average during the whole five-year period is only 9.2.

(d) Mr. Broomhall has received persistent reports of damage through winter frost, together with spring and summer drought.

(e) The *Times* (London), August 14th, reported the condition of wheat August 1st as 88.6, compared with 85.8 the previous month and 90.75 the previous year. Rains, coupled with high winds, have lodged the grain in some sections, both delaying the harvest and injuring the crop.

(f) Weather conditions have so far been excellent for the new wheat sown on a reduced area, not yet officially reported. Harvesting begins in December.

(g) The central European enemy countries have not published any official report since the war. It is to be presumed that they have decreased their production about in the same proportion as that ascertained to exist in France, which has issued official estimates. In this table, in so far as these countries and those under their domination are concerned, there can only be shown a general approximation to the real situation. To arrive at their production for the last couple of years we have reduced their annual averages for the five-year period before the war to conform approximately with the decreased average of France as compared with the same five-year period. For 1916 20%, or considerably less than the French reduction has been made; for 1917 the reduction has been figured at 40%, which is slightly less than the reduction which has actually occurred in France. It is believed these reductions are fully justified, not only on account of the general similarity of conditions imposed by the war, but, particularly in 1917, the inclement conditions during the winter coupled during the winter and summer with exceptionally droughty conditions from which France has been practically free. Positive information has been ascertained in regard to the surrounding countries subject to the same climatic conditions, namely, Sweden, Denmark, and Northwestern Russia, where the drought especially has had serious effects. It is admitted at Vienna that similar, if not worse, conditions have prevailed in Austria. Mr. Broomhall's correspondents grant for Hungary a crop probably but slightly under that reported for 1916.

(h) These figures refer to Russian Poland and the other Russian Provinces detached by the German invasion. This same territory produced before the war over two-thirds of Russia's total potato crop.

PROSPECTIVE REQUIREMENTS AND SUPPLIES

A general view of the world's production statement shows that the prospective production in 1917 will be a little over 8,000,000 bushels more than that of the preceding year, and about 362,000,000 bushels less than the pre-war average. We are, however, immediately concerned only with those countries which are accessible to the world's commerce. The European and Mediterranean countries, whether entente or neutral, more or less dependent for their supplies on the outside world are: Denmark, France, Greece, Italy, Netherlands, Norway, Portugal, Cyprus and Malta, Spain, Sweden, Great Britain, Ireland, Egypt, Tunis, Switzerland, Belgium.

Separating these countries from the preceding table, the total production of wheat in them we find was in 1917, 592,607,000 bushels compared with 704,193,000 in 1916 and compared with 782,791,000 in the pre-war average. There is therefore, a reduction of 101,586,000 bushels as compared with 1916 and a reduction of 190,184,000 as compared with the pre-war average.

For the leading countries among these we present as follows the imports as so far officially reported for the year 1916-17, the prospective imports for that whole year at the same rate of monthly shipment, and present, moreover, a tentative estimate of the quantities which these countries and the European countries as well might reasonably be expected to require for 1917-18 under all the circumstances ascertained to date:—

Countries.	Actually imported 1916-17		Imports at same rate for full year 1916–17.	Probably needed for 1917–18.
	No. of months.	Quantities imported.		
		Bushels.	Bushels.	Bushels.
United Kingdom	6	88,000,000	176,000,000	190,000,000
Italy	10	60,000,000	72,000,000	90,000,000
France	5	62,000,000	138,000,000	160,000,000
Holland	5	11,000,000	26,000,000	20,000,000
Belgium	....	....	24,000,000	24,000,000
Scandinavian countries	....	....	....	13,000,000
Spain and Portugal	....	....	....	8,000,000
Greece, Salonika and Serbia	....	....	....	20,000,000
Switzerland	....	....	....	15,000,000
Total European requirements	....	....	....	540,000,000
Requirements Ex-Europe	....	....	....	50,000,000
Total requirements	....	....	....	590,000,000

In view of the lessened production in Europe, whether the above estimates of certain countries are or are not exaggerated, the total does not seem large, and is probably much under the quantities which will have to be shipped from the exporting countries to eventually meet all the actual requirements. Fifty million bushels only are allowed to countries ex-Europe which before the war actually imported on an average 98,000,000 bushels.

On the export side, leaving out of our estimate Russia, Algeria, Uruguay and Chili, whose shipments will probably be negligible, and bearing in mind for the moment only such quantities as shipping facilities will probably allow, we submit the following prospective exports:—

Countries.	Probable home supplies 1917 crop.	Actual Exports 1916–17	Prospective shipments 1917–18
	Bushels.	Bushels.	Bushels.
Canada	255,000,000	174,565,000	175,000,000
United States	680,000,000	189,123,000(a)	140,000,000
Argentina (new crop)	200,000,000	58,477,000	100,000,000
Australia (old and new crops)	306,000,000	74,995,000	100,000,000
India	379,000,000	42,527,000	60,000,000
	1,820,000,000	539,687,000	575,000,000

(a) Month of July estimated.

This total of 575,000,000 bushels is submitted merely tentatively. Mr. Broomhall reports that about August 1st the visible stocks of wheat in Australia were 87,000,000 bushels compared with 74,000,000 the year before, and that the combined stocks of the Federal Wheat Pool on that date were 156,184,000 bushels. The new crop to be harvested in December and January, and which could not in any event begin to reach Europe before February in view of shipping facilities, may practically be excluded from present consideration. It is problematical for what proportion of the 156,000,000 bushels of the old crop shipping facilities may be available. The same remark applies to the new Argentina crop, concerning which there is at present such a fair prospect.

THE OTHER CEREALS

Official data concerning other cereals, so far very meagre, do not at present justify any detailed forecast. The conditions which make for good or bad wheat crops influence production of the other cereals, and the European shortage of wheat is likely to be accompanied to some extent by a corresponding shortage of rye and barley. These cereals, together with oats and Indian corn, will be dealt with in a later issue of THE AGRICULTURAL GAZETTE.

DIRECTORY OF THE DEPARTMENT OF AGRICULTURE.

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Private Secretary..William Ide, B.A.

Deputy Minister.........................Geo. F. O'Halloran, B.A., B.C.L.

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Commissioner under The Agricultural Instruction Act..W. J. Black, B.S.A.

Chief Translator...............................C. E. Mortureux, B.S.A.

The Dominion Experimental Farms Branch..Director, J. H. Grisdale, B.Agr.

On the Central Experimental Farm and twenty Branch Farms and Stations distributed over Canada, conducts research and experiments in animal, field, orchard, garden and greenhouse husbandry, distributes superior seeds, analyzes and tests fertilizers and feeding stuffs, studies diseases of plants and administrates ordinances for their control, and demonstrates what are of value.

The Dairy and Cold Storage Branch.........Commissioner, J. A. Ruddick.

Encourages and assists in the development of the dairying industry and the improvement in the storage, transportation, sale and trade in agricultural products; administers the Dairy Industry Act (1914), the Cold Storage Act (1907), and the Cold Storage Warehouse Act (1914).

The Seed Branch................Commissioner, George H. Clark, B.S.A.

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The Live Stock Branch... Acting Commissioner, H. S. Arkell, M.A., B.S.A.

Encourages and assists the development of the live stock industry.

The Health of Animals Branch....Veterinary Director General, Frederick Torrance, B.A., D.V.S.

Administers the Animals Contagious Diseases Act and the Meat and Canned Food Act. Protects Canadian live stock from contagious diseases.

Entomological Branch...Dominion Entomologist, C. Gordon Hewitt, D.Sc.

Conducts investigations on insects in relation to agriculture, encourages the use of methods of prevention and control and administers the Insects and Pests Section of the Destructive Insect and Pest Act.

The Fruit Branch.......................Commissioner, Donald Johnson.

Encourages the development of the fruit industry along commercial lines. Also administers Part IX of the Inspection and Sale Act, relating to fruit and fruit packages.

International Institute of Agriculture..Commissioner, T. K. Doherty, LL.B.

Supplies Institute at Rome statistics and official information respecting agriculture in Canada and prepares for distribution in Canada corresponding information from countries adhering to the International Institute of Agriculture.

The Publications Branch...........Editor and Chief, J. B. Spencer, B.S.A.

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